Machinery's

BLUE BOOK

DECEMBER 1950

★

SPECIAL REPORT ON
AUTOMATIC SCREW MACHINES

★

Planned Tooling and Attachments for Screw Machine Work

How to Estimate Work for Automatics

Contents on Page 5

A HITCHCOCK PUBLICATION

ESTABLISHED 1906



Below (left) is a model 9A MARVEL High Speed Production Saw with automatic bar push-up, which automatically cuts off billets to exact size (ends fin waste), and, a No. 18 MARVEL Giant Hydraulic Hack Saw for cutting off large bars and billets and trimming dies in sizes up to 18" x 18" cross section.

Marvel Saws Cut off Hours from Die Maintenance Time

Hubbard & Company, Pittsburgh, manufacturers of pole line hardware, picks, hammers and other drop forged specialties, use MARVEL Saws to eliminate tedious hours in making and maintaining their giant forging dies. Not only do these saws do all regular cutting-off of steel for the machine shop, die blocks for die shop and exact size billets for the forge shop, they also materially cut the cost of die maintenance.

Previously, it was necessary to plane the face of dies being reworked. This was a long and tedious job because the die face is always work-hardened with hard spots that had to be chipped or ground out before the planer tool could make a cut. Now with MARVEL Saws, the face of a die is speedily and accurately "skinned" —a thin slice is sawed off just behind the hard spots. After this speedy "skinning" and a single facing cut on the planer, the die is ready for the die sinker. This modern MARVEL method is saving Hubbard a lot of dies, materials, labor and machine time.

For quick reference see our section in Sweet's File—Mechanical Industries or write for catalogue.

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Better Machines–Better Blades

ARMSTRONG-BLUM MFG. C

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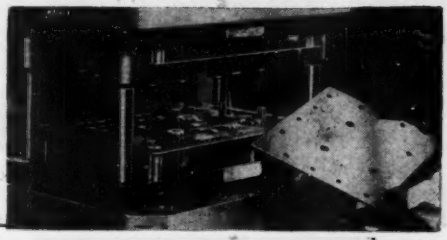
LOW COST

methods for PERFORATING and NOTCHING SHEET METALS

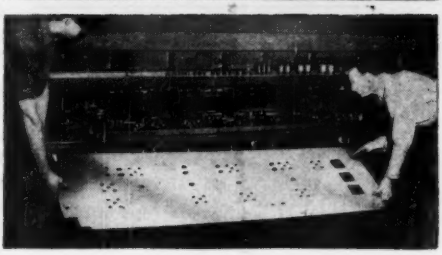
Both methods feature: LOW DIE COSTS

All units and parts are interchangeable and used repeatedly in different arrangements. **INCREASE PRESS PRODUCTION** – Down time is minutes as compared to hours for changeover. For precision work in all types and sizes of presses. **START PRODUCTION *at once.*** Pierce up to ¼" thick mild steel. Saving money in the best known plants.

Whistler *MAGNETIC* Dies at work in large inclinable press. Magnetized units hold the retainers. No bolting required. A fast, economical method in making up a punch and die set for short or long runs. All parts re-usable.



Whistler *ADJUSTABLE* Dies on ⅛" steel perforating and notching job, using Tee slotted die set. With Whistler Punch and Die units production starts within hours instead of weeks. Last minute job changes made quickly.



Here are the complete details with prices and application illustrations. Send for these catalogs. No obligation.



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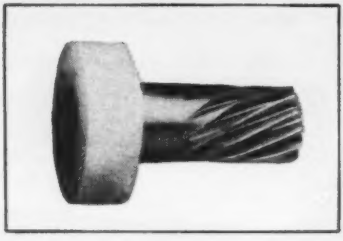
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Adjustable, Magnetic, Custom and Cam Dies for all Industry

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Wade offers you . . . 3 Times the Production





George Waterman, Superintendent of Massachusetts Gear & Tool Co., Woburn, Mass., increased turning production of a nylon gear to 3 times his former volume, because operators could load and unload work faster by stopping and starting the headstock spindle with the Wade type drive.

He maintains constant production within precision tolerances as no deviation occurs from the original set-up.

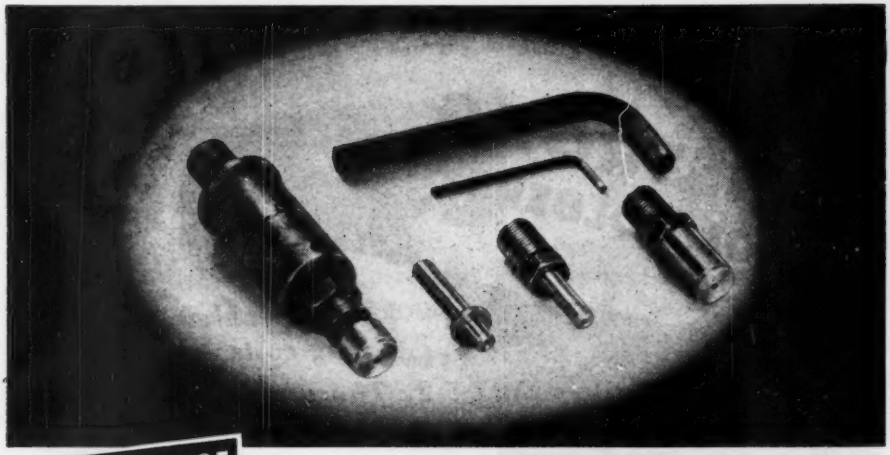
At 3300 r.p.m. spindle speed, the nylon blank is turned to O.D. just under 1", maintaining a tolerance of ± .0005".

The Wade Hand Screw Machine is so easy to operate that less expensive, inexperienced machine operators can produce with excellent results. Our Sales Engineer will be pleased to call and introduce you also to **INCREASED PRODUCTION.**

SAVE WITH INCREASED PRODUCTION AND LOW INITIAL MACHINE COST.

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UNIVERSAL COLLET STOP SET

For Your Second Operation Chucking Work

. . . Converts standard 1" capacity 5C Hardinge Collets into solid stop or spring ejector stop collets *without alteration* of the standard collets. Also fits other 1" capacity lathe collets, regardless of the collet length.

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The use of a Hardinge Universal Collet Stop eliminates your buying special step collets or applying permanent stops. You save time and money. Write and ask for bulletin CS giving further details and price.

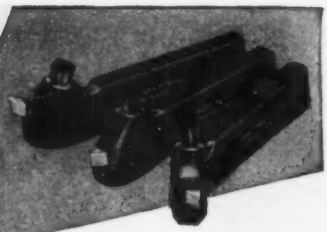


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answer both . . .

1. *The problem of lowering costs*
2. *The problem of increasing output*

By providing permanent, multi-purpose, inexpensive ARMSTRONG TOOL HOLDERS that use cutters or bits that are quickly ground from standard high speed shapes (Saving: All Forging, 70% Grinding and 90% High Speed Steel), the Armstrong System of Tool Holders will reduce your tool cost to an absolute minimum.

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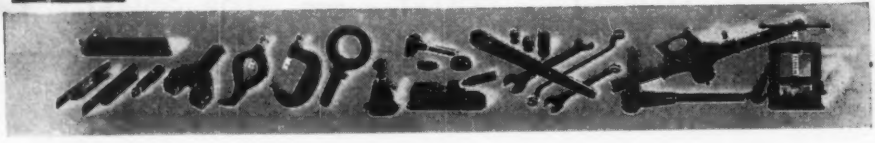
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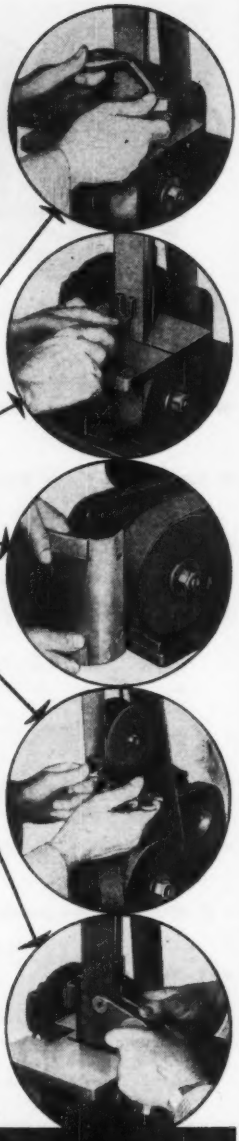
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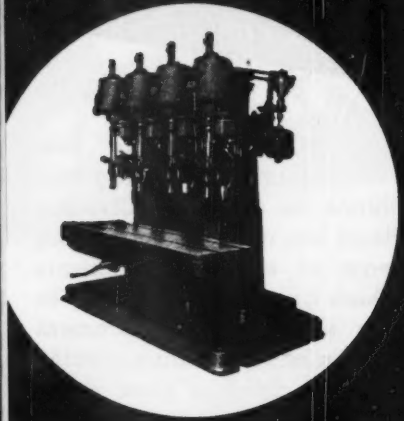
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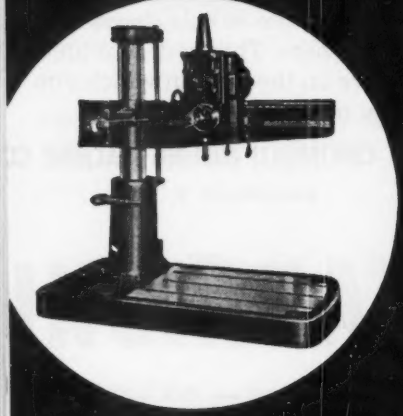
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6" Royal Sensitive Bench Drill, single and multiple spindle. Bulletin 216.



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Royal Radial Drill—3', 7" column. Bulletin 116.

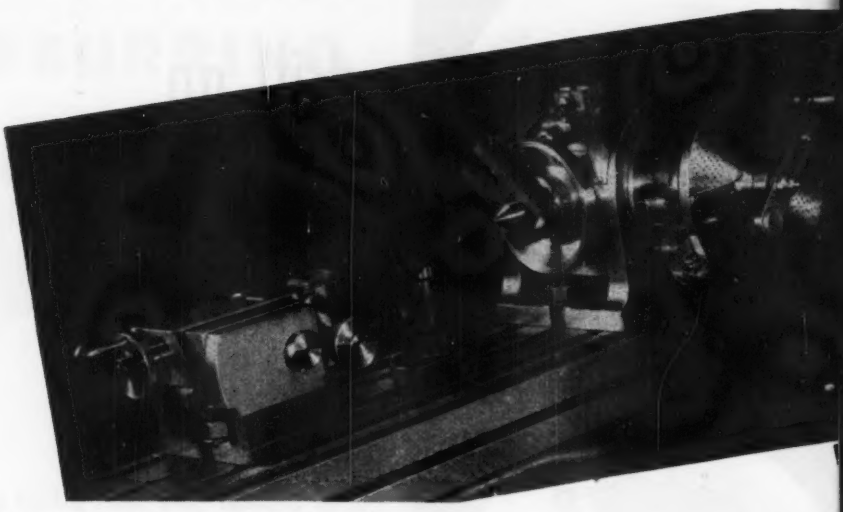
how to drill an argument full of holes

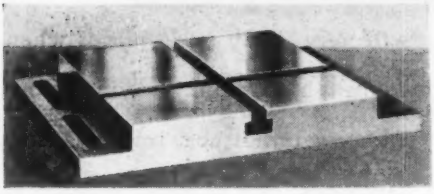
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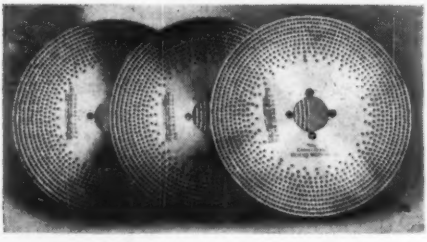
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RIGHT ANGLE PLATES for offsetting the Dividing Head from the table T-slots, or setting it up to face the machine spindle. Publication M-644-1.



HIGH NUMBER INDEXING ATTACHMENT. These plates interchange with standard index plate supplied with CINCINNATI Dividing Heads. Publication M-987.

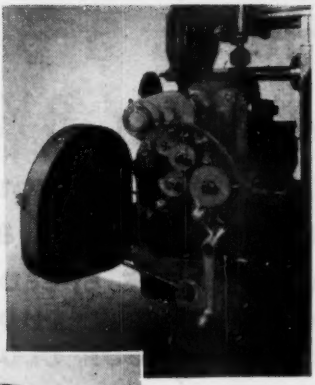
Easily the star performer on milling machines, the CINCINNATI Dividing Head has a strong supporting team of eight attachments which gives it extra value in any shop. Each attachment lends a hand in milling specific types of dividing head work. Some of them can be employed to advantage in your shop. It's easy to see how; just look at the whole team pictured here. Then write for literature on the ones in which you are interested.

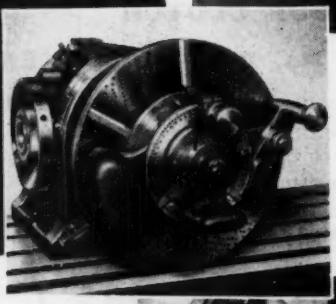
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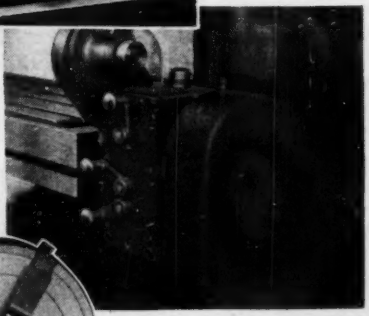
SUPPORTING TEAM for the STAR PLAYER

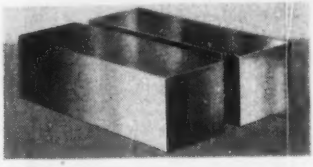




ENCLOSED DRIVING MECHANISM for driving Dividing Heads mounted on the newer CINCINNATI plain, universal, and vertical millers. Lead range 2½" to 100". Publication M-1016-2.

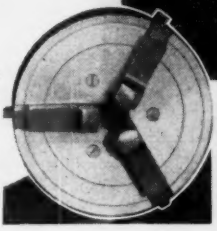
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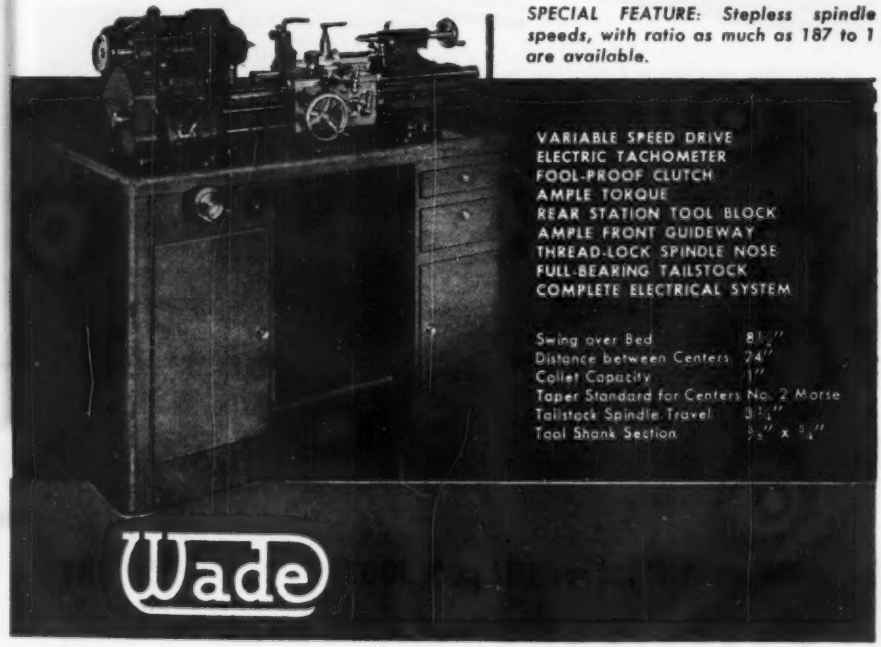
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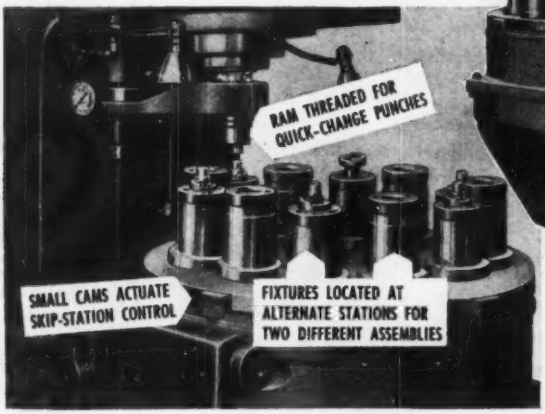
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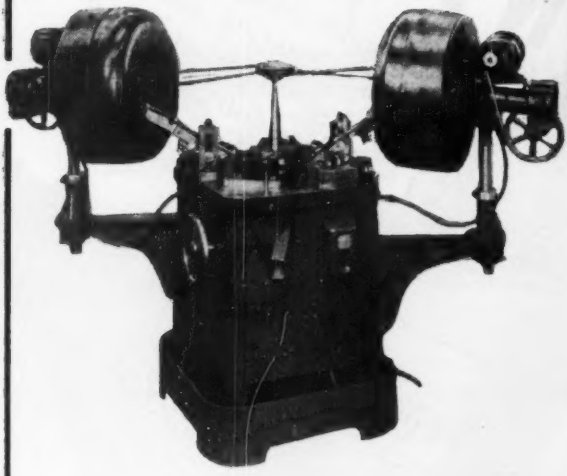
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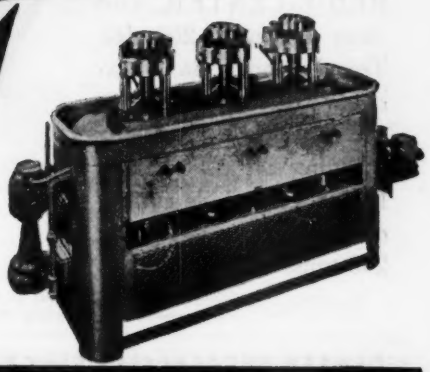
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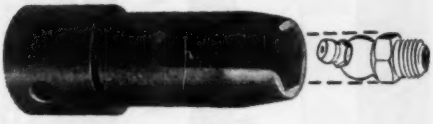
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Catalog 19 lists this complete line of Apex production tools . . . a note, on your company letterhead please, will bring your copy.

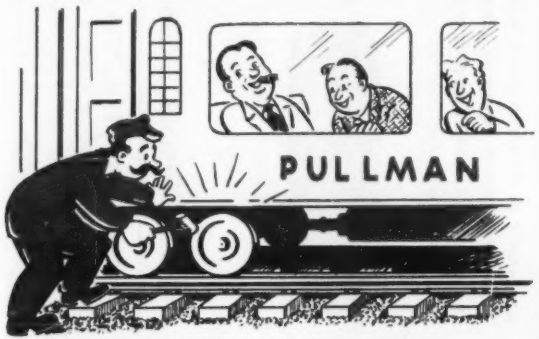


APEX sockets, extensions, adapters

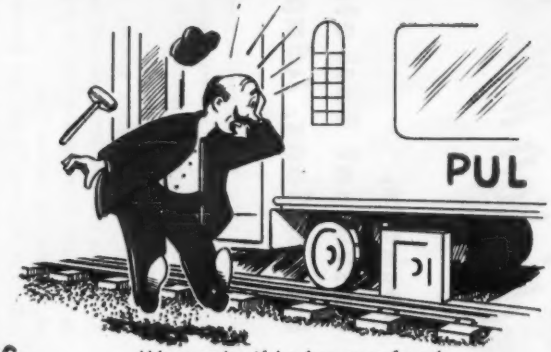
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Sometimes we laugh at the patient zeal
Of the man who "taps" the Pullman wheel!



We wonder if he has ever found
A wheel that's square instead of round!

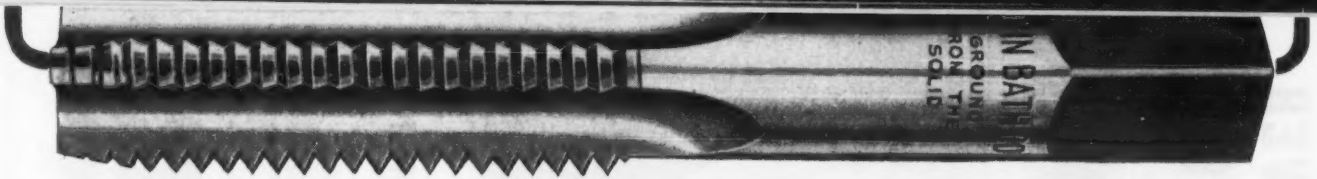
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Yet we both work for your protection
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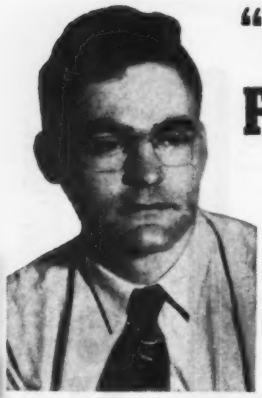
Bath "ground from the solid" Taps are precision cutting tools and as such are subjected to the most rigid inspection. Accuracy, hardness, flutes, chamfering . . . all these important qualifications must pass pre-determined Bath laboratory standards. Here, a constant check is kept on raw materials, heat treating and every step of manufacture. Bath technicians continually use the most modern research facilities to assure the superiority of Bath Taps for longer wear, higher speed and greater production. If you are having threading difficulties, we will be glad to help you select the right tap for your job.

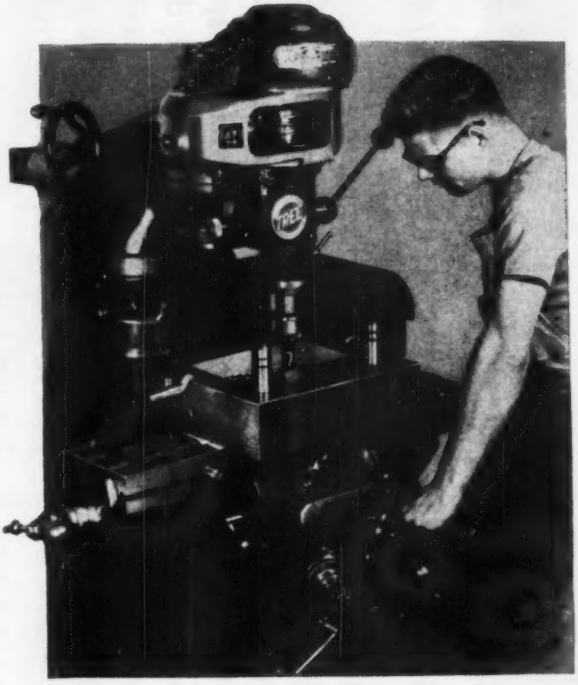
PLUG AND RING THREAD GAGES • GROUND THREAD TAPS • INTERNAL MICROMETERS

JOHN BATH CO. INCORPORATED

14 Grafton St., Worcester, Mass.

"A REAL TIME SAVER FOR OUR TOOL SHOP"





We have been using the TREE Milling Head Attachment in our tool and mold shop since 1947 and have found it to be a very rigid head for all milling operations. Its greatest value to us has been the time saved in cutter changes.

Of almost equal importance to us is the secure locking of the cutter itself in the collet. We now have four of the Tree heads in daily operation and have never experienced loosening or traveling of cutters in work.

signed,
D. P. Richards, Pres.,
RICHARDS TOOL & MOLD CO.

TREE MILLING HEAD ATTACHMENT

The versatile Tree Milling Head Attachment will speed up tool room operations in your shop. It's a precision unit that does milling, drilling or boring operations . . . AT ANY ANGLE. Greater capacity enables use of tools with shanks up to ¾". Equipped with power feed . . . automatic collet closer. Compact design . . . 4" quill travel . . . Eight speeds—140 to 3500 RPM or 210 to 5200 RPM. Hardened and ground spindle and quill . . . Enclosed micrometer depth stop. Write for complete specifications today.

Export Office: States Trading Co., 401 Broadway, New York 15, N. Y. Cable: "STRADESO N. Y."

TREE TOOL AND DIE WORKS
1600 JUNCTION AVENUE RACINE, WISCONSIN

. . . for micrometer-precision speed control

HANNA Flo-Set SPEED CONTROL VALVES



IF YOU WANT precision speed control, measured by a consistent, constant gauge, Hanna now offers a new line of Flo-Set Valves in ¼", ⅜" and ½" for exacting speed control of low pressure cylinders. Micrometer graduations are in hundredths of a revolution, with each hundredth representing 1/100 of the pipe area to permit precision regulation of flow. For light piping and tubing, there's a ¼" Flo-Set Jr. Valve, which operates the same as the larger units but does not include the micrometer markings.

Hanna Flo-Set Valves are suitable for air, oil or water control, with maximum pressure to 250 p.s.i. and maximum temperature to 250° F. They may be mounted in any position.

Details and specifications are included in a new bulletin—be sure to send

Valves shown are approximately ¾ actual size



Write for New Bulletin & Catalog

For full information on Hanna Flo-Set Valves ask for Bulletin 253. You'll also want a copy of new Hanna Valve Catalog No. 254 showing the complete line of Hanna Valves.

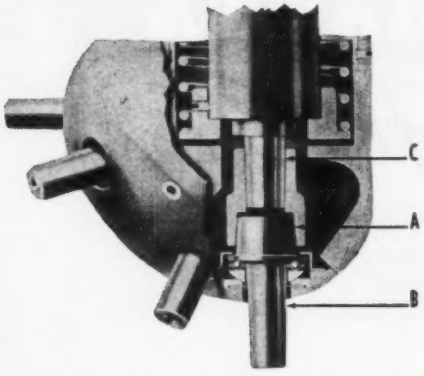
Hanna Engineering Works

HYDRAULIC AND PNEUMATIC EQUIPMENT . . . CYLINDERS . . . VALVES . . . RIVETERS

1765 Elston Avenue, Chicago 22, Illinois

MORE HOLES
PER HOUR — PER DOLLAR

Increase production of any standard drilling machine by adding a Lign-o-matic, the *only* drill turret with the patented, self-centering principle that guarantees sustained accuracy equal to the drilling machine itself.



FOR ALL CONSECUTIVE DRILL PRESS OPERATIONS

PROVED PRODUCTION INCREASE — Turret indexes faster than tools can be changed or work moved to another spindle. A single Lign-o-matic will release 5 drilling machines for other work and still show increased production and reduced costs on original job.

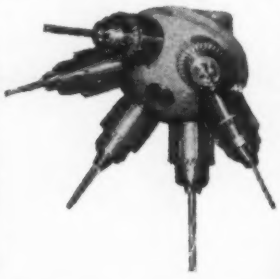
VERSATILITY— Fits any standard drilling machine without altering the machine. Handles operations such as drilling, reaming, counterboring, and tapping (on reversible spindle machines), up to ½" diameter in any material.

PRECISION — Patented, self-centering tapered drive (A) automatically locks turret spindle (B) into exact alignment with drilling machine sprindle (C) for sustained accuracy.

GUARANTEE — May be returned in 10 days *for any reason* for full refund of purchase price. Two-year guarantee against defective parts.

PRICE — Model D, 6 spindles with No. 2 Jacobs male taper $235.00
Chucks extra at established prices.

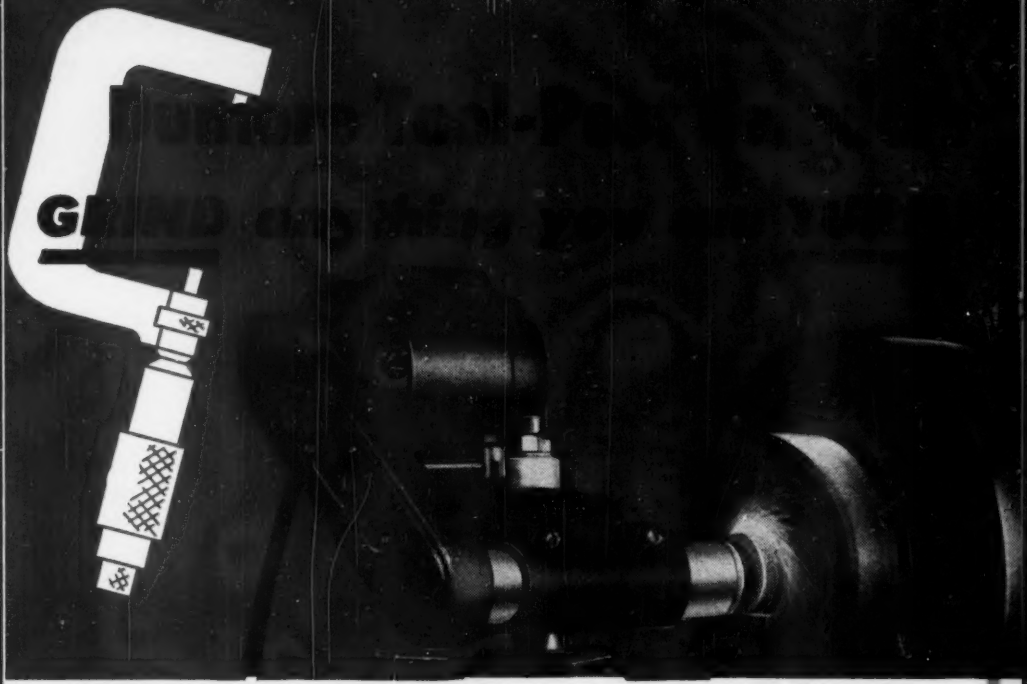
DELIVERY— Currently, 2 weeks.



☐ Please rush ..... Lign-o-matic turrets for
(drill press make)..... (size).....
(quill dia.)..... (spindle taper).....
My name.....
Title.....
☐ Please send literature on Lign-o-matic turret.
(Attach coupon to company letterhead)

HOWE & FANT, INC.
525 FLAXHILL RD., SO. NORWALK, CONN.

.0001" ACCURACY



PRECISION OF FIT

Dumore Tool-Post Grinders turn out internal work fast and accurate to .0001". Only Dumore combines rugged strength with precision construction to give you big grinder performance and accuracy at a price you would expect to pay for an accessory.

PRECISION OF FINISH

Surface analyser charts prove that a Dumore provides fine finishes. On every Dumore, critical dimensions are held to .0001" . . . all rotating parts are balanced . . . all ball bearings selected and pre-loaded . . . motor windings pre-expanded. No expense is spared to insure smooth tool performance.

HIGH-SPEED PRODUCTION

Fast set-up, high speed, interchangeable quills, ability to take turn in work cycle, plus flexibility of set-up, mean lower cost per piece. See for yourself how others keep costs down with Dumores. Write today for free catalog!

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DG-8



Tool post Grinders | Handgrinders | Automatic Drill Head | High Speed Drill Press | Quills | Flexible Shaft Tools

Dumore



SUPER BALL BEARING

For Your Heavy Duty Drilling

The frictionless tightening permitted by its ball bearing construction gives this rugged chuck the world's tightest grip.

When drilling tough metals under heavy duty conditions, insist on Jacobs Super Chucks to eliminate tool slippage and to reduce drill breakage.

Jacobs Ball Bearing Super Chucks and Plain Bearing Chucks are stocked by your nearby Industrial Supply Distributor. The Jacobs Manufacturing Company, West Hartford 10, Connecticut.



PLAIN BEARING

For Your Medium and Light Work

The most widely used drill chuck in the world today. Its rugged design and construction assuring precision performance over a long service life come from 47 years of experience in manufacture.

That's why makers of drill presses, pneumatic and electric portable tools insist on Jacobs Plain Bearing Chucks as original equipment.

FOREMOST IN CHUCKS · FIRMEST IN GRIP ·

If it's a JACOBS, it holds

Jacobs Chucks

NOW . . . USING STEEL PLATE SHAPES IS

EFFICIENT

You start one step ahead—that much nearer the finished job—with By-Products steel plate shapes. Flame-cut, sheared, bent, pressed or blanked to close tolerances, they're ready for quick finishing and assembly.

ECONOMICAL

You save on scrap loss and scrap handling. You buy only what you use and are given scrap credit at the mill where value is highest. And, you get greater output without increasing your investment in plant equipment.

EASY

Whether you need one piece or thousands, just send a blueprint for a free quotation, and compare your shaping time and materials cost with By-Products' prices. Address By-Products Steel Co., 515 Strode Avenue, Coatesville, Pa.

Plate that's shaped to save you money

BY-PRODUCTS STEEL CO.

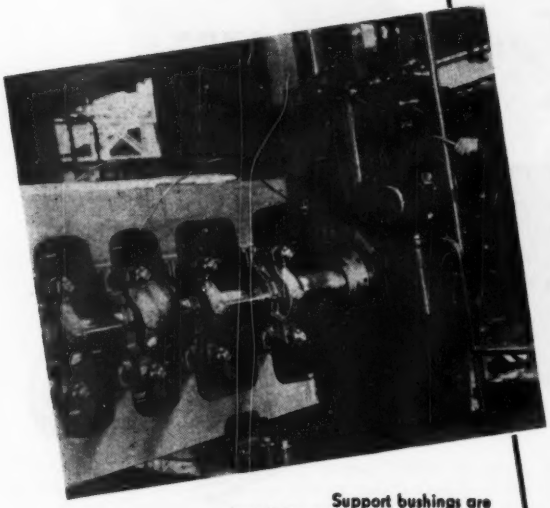
A DIVISION OF LUKENS STEEL COMPANY

LUKENS

DAVIS BORING TOOL

REDUCES CRANKSHAFT BEARING REPLACEMENT TIME IN DIESEL ENGINES

Easy Adjustment of Micrometer Cutter Block in Line Bar Simplifies Precision Boring Operation ...Method Used Assures Alignment



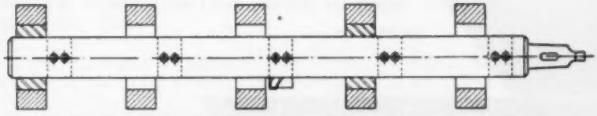
Support bushings are placed in two good bearings to align the bar. Simple adjustment of micrometer cutter determines correct bore size of the crankshaft bearing being repaired.

● "Out-of-service time" because of bearing replacement or repair in Diesel engines is materially reduced by using Davis line boring bars equipped with micrometer adjustable cutter blocks. Simple setting of the micrometer screw adjusts the cutter to the desired bore diameter. There is no "cut and try" necessary to size the bore nor is there danger of misalignment.

The boring method is unusually simple. Precision bushings are placed in the sound bearings nearest the damaged bearing. These support the boring bar and assure positive alignment. The cutter block is easily inserted in the bar slot and set to required bore dimensions. The operation is then rapidly completed.

Whatever your standard or special boring requirements are, either in building or repairing Diesel engines, it is profitable to call on experienced Davis engineers for recommendations.





Line boring bar showing position of cutter ready to bore bearing. Micrometer adjustable cutter block is illustrated at left.

DAVIS BORING TOOL DIVISION

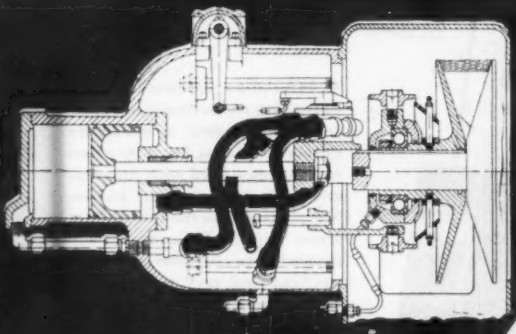
GIDDINGS & LEWIS MACHINE TOOL CO.

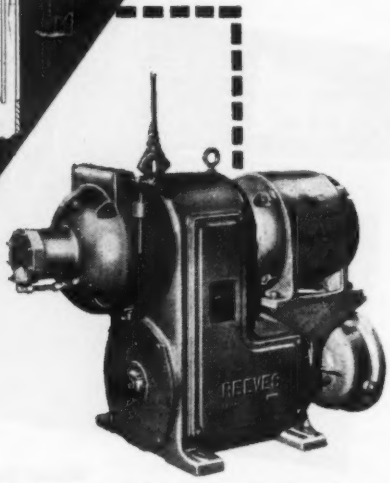
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Norgren Hoses in Reeves Motodrive Test Take

4,172,500 Operating Cycles

with no sign of failure!





SPECIFY NORGREN HOSE ASSEMBLIES . . .

. . . and get this extra quality for YOUR equipment. Reusable or permanent couplings; wide range of sizes of every pressure.

For Application Data Sheet No. 102, write C. A. Norgren Co., 238 Santa Fe Drive, Denver 9, Colorado



Price $975.00

Complete with motor and switch

Prompt Delivery

Here is a ruggedly constructed press brake designed to handle the jobs formerly run on the hand brake or on the larger, more costly press brakes. Efficient in performance, economical in price, the Royal 50-16 Press Brake embodies many features found only in larger machines. Here is the answer to the need for a speedy and accurate press brake for smaller jobs, where versatility and ease of operation are available at low cost. Here are a few important specifications. All steel construction throughout. Length of Bed & Ram — 50". Capacity ranges from 50" length of 16 ga. steel, 36" length of 14 ga. steel, 24" length of 10 ga. steel.

If yours is a large shop tying up large expensive machines for small jobs . . . or a smaller shop using hand brakes, it will pay you to investigate the Royal 50-16 Press Brake.

ROYAL PRESS COMPANY

548 W. MONROE ST. CHICAGO 6, ILL.

ASSORTED NEEDLE FILE SETS
5½" and 6¼" overall
ESCAPEMENT FILE SETS
X & XX 5½" overall



Pat. Pend.

MODERN
new needle file case

- Kit Divides into Two Compartments
- Plastic Spring holds each File secure
- Files do not touch
- Fine Points protected
- Practical for bench use

GROBET, since 1812—the oldest name in files and the leader in its field is now bringing to you the most efficient clear plastic packaging for Precision Swiss Needle File Sets and Escapement File Sets **at no extra cost.**

Sold thru leading supply houses.

Send for Bulletin CK.

GROBET

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Specify POPE
PRECISION INTERNAL GRINDING SPINDLES



7 FEATURES
Which add up to BETTER WORK at LOWER COST

1. **Increased Production.** Pope Spindles speed up output because they can take heavy cuts.
2. **Increased Wheel Life** because the shaft is rigidly supported by bearings of ample size.
3. **Super Precision Bearings** made to Pope specifications and used exclusively in Pope Spindles.
4. **Better Finished Ground Holes.** Pope precision craftsmanship assures work of the highest standard.
5. **Operating Time Saved.** One motor pulley serves all spindles except in unusual applications.
6. **No Additional Lubrication** is ever required. Thirty years of wide factory use has proven the ability of the Pope System of Sealed-in Lubrication to prolong bearing life, reduce maintenance costs and provide cool operation.
7. **Dynamic Balance.** Pope Spindles are dynamically balanced with all their rotating parts in full assembly to insure smooth running.

Pope Precision Internal Grinding Spindles come in the sizes, shaft extensions and speeds (up to 35,000 RPM) to meet your every need. Ask for new catalog No. 57.

No. 73

POPE
TRADE MARK REG. U.S. PAT. OFF.

POPE MACHINERY CORPORATION
ESTABLISHED 1920
261 RIVER STREET • HAVERHILL, MASSACHUSETTS
BUILDERS OF PRECISION SPINDLES

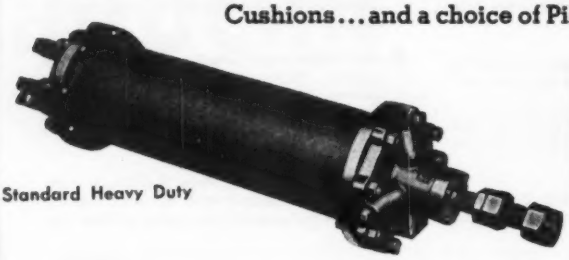
Dependable Cylinder Power *by* NOPAK



Series 15 High Pressure Hydraulic

For simplified machine movements . . . for pulling, pushing, lifting, clamping . . . with power range from Low Pressure Air to High Pressure Hydraulic . . . there's a NOPAK Cylinder to meet your needs.

NOPAK Cylinders are available in 4 different classes of construction . . . to meet varied service requirements and to accommodate line pressures from 50 to 2000 P. S. I. . . . in 6 Standard Mountings... with or without Adjustable or Self-Regulating Cushions... and a choice of Piston Assembly Types.



Standard Heavy Duty

For further information and data on NOPAK Cylinders and Valves, refer to Sweet's File for Product Designers, or write for Bulletin SW-1.

GALLAND-HENNING MFG. CO.
2754 South 31st Street
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Representatives in Principal Cities

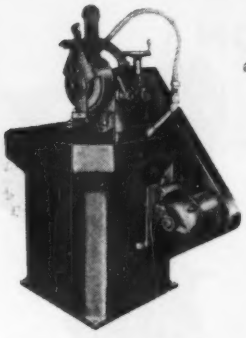
NOPAK
VALVES AND CYLINDERS
DESIGNED for AIR and HYDRAULIC SERVICE

Making A Standard For— Tomorrow

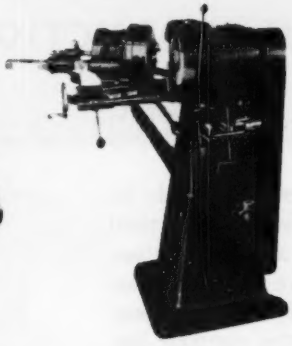
OLIVER OF ADRIAN

OLIVER OF ADRIAN

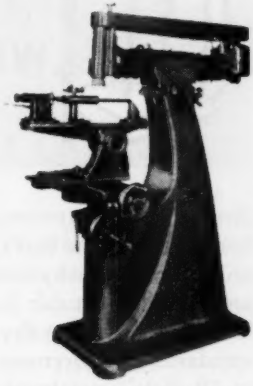
For 30 years Oliver of Adrian has designed and manufactured precision machines with the firm thought of the future. Oliver Instrument Company is dedicated to the task of producing for American Industry the ultimate in cost reducing toolroom machinery. Oliver gives you that "something extra" that is vital to outstanding performance.



Oliver Template Tool Bit Grinder (2 models)



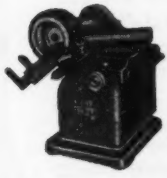
Oliver No. 510 Drill Pointer



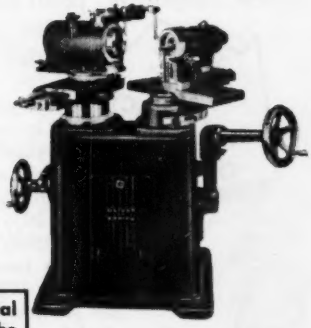
Oliver Ace Tool and Cutter Grinder (2 models)



Oliver Diemaking Machine (5 Models)



Oliver No. 21 Bench Drill Grinder



Oliver No. 2 Arc Face Mill Grinder (2 Models hand operated or fully automatic)

Write today for complete technical information on any or all of the above machines illustrated. Your inquiries solicited.

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OLIVER INSTRUMENT CO.

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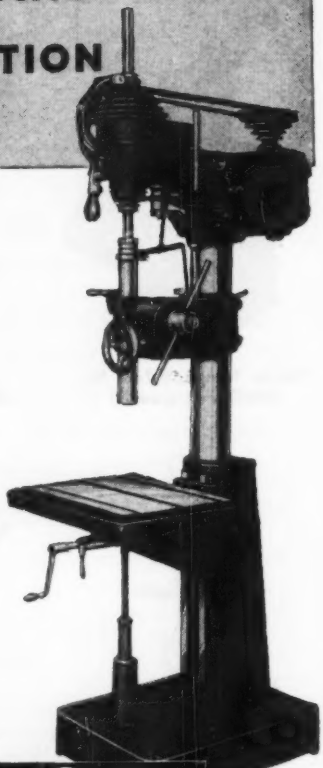
AUTOMATIC DRILL GRINDERS—TOOL & CUTTER GRINDERS—DRILL POINT THINNERS—TEMPLATE TOOL GRINDERS—FACE MILL GRINDERS—DIEMAKING MACHINES



Obsolescent Tools Drain Profits!

REPLACE WITH MODERN "Buffalo" TOOLS AND WATCH PRODUCTION CLIMB!

Even the most experienced operator can't do his best on a machine that's old enough to be retired on pension. So why not check to make sure you aren't giving valuable floor space to any tool that isn't "up" to present-day accuracy and high-speed standards? Replacement from the complete line of "Buffalo" metalworking tools will lend new skill and speed to your operators — and give you a new competitive "profit edge." Below are bulletins on "Buffalo" tools that can do it for you.



WRITE FOR YOUR FACTS ON DRILLING



If you drill up to 2" holes in cast iron, you'll get easy, smooth operation with the big, rugged "Buffalo" No. 22 Drill shown at right. WRITE FOR BULLETIN 2989-F. Or, with the "Buffalo" "RPMster," you can change speeds instantly without shutting off the motor. WRITE FOR BULLETIN 3257 and see how this can cut your setup time. And for a rigid, accurate, fast-action drill to handle up to ⅞" holes in cast iron, WRITE FOR BULLETIN 2730-F, on the No. 16 Sensitive Drill.

"Buffalo" METAL WORKING TOOLS

BUFFALO FORGE COMPANY
161 MORTIMER ST. BUFFALO, NEW YORK
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

MARK IT FOR MARKET!



CLEAN . . . LEGIBLE . . . PERMANENT . . .



MODEL
175
HYDRAULIC

Identification ROLLED into your products will help you market them.

Hack Saw blade above has been permanently marked in a Model 175 Hydraulic Marking Machine using a solid engraved lettering knurl.

Your name, model number, part number, serial number or decorative designs can be rolled into your components to improve their appearance and facilitate identification.
Send prints of parts, showing required marking and its location on part with hourly production for free recommendation.

WRITE FOR CATALOG

GTS GEO. T. SCHMIDT, INC.
1802 W. BELLE PLAINE AVENUE
CHICAGO • 13 • ILLINOIS



...Strictly off the cuff...

At one time or another, you have probably been contacted by an advertising agency that has studied your product and shown you their ideas on how to present it in the most salable way. I represent the Herzberg Corporation in just such a manner.

In order to write copy and prepare ads on the Herzberg Multiple Drilling and Tapping Head, I've watched the Heads being made and have seen the precision craftsmanship and the material that goes into them. Next I went to several concerns that are using Herzberg Heads and got the viewpoints of the front office, the foremen and the workers themselves — the Herzberg Head does truly offer production with economy and efficiency.

Mr. Herzberg asked that our ads offer to help *you* with your production problems. I've sat in at a meeting in which the management and the Herzberg Engineers have taken the problems sent in and combined their knowledge to arrive at the most satisfactory solution. The Herzberg Head was not the answer to every problem, but the greatest percentage could be solved the Herzberg way.

Why not let the Herzberg Corporation help *you!* I've seen the Head being made — I've seen it in action and I agree, as do those now using the Herzberg Head — it *does* offer production with economy and efficiency!

BORTZ Advertising Inc.

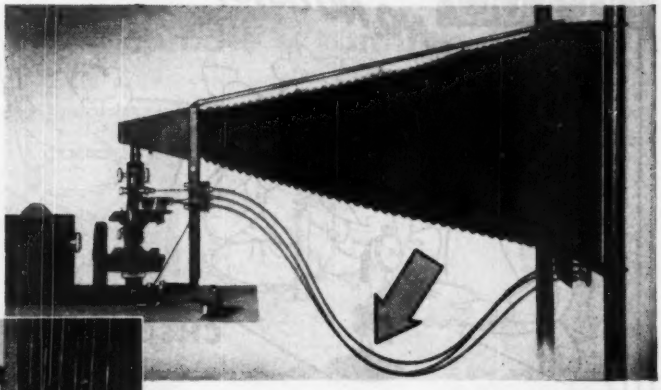
Representing

the Herzberg Corp.

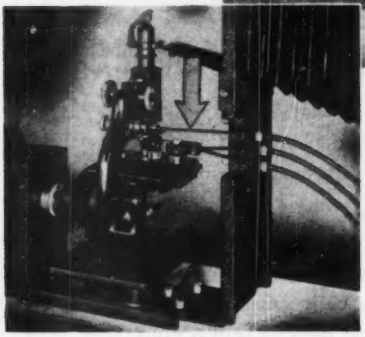
633 E. CENTER ST.

MILWAUKEE 12, WISC.

Sensitive fingers 4 feet long...



Courtesy Mine Safety Appliances Co. Pittsburgh, Pa.



Closeup of flexible shaft connection to microscope of Microprojector above. Enlarged image of microscope's field is thrown on translucent screen on right end, where operator centers and focuses image.

...focus a microscope

They're S.S.WHITE remote control flexible shafts. As the photos show, they connect the microscope's three focusing knobs to control knobs 4 feet away. And they fully satisfy the unit's need for close, sensitive manipulation. They would do this whether the distance was 4 feet or 40—because S.S.WHITE remote control flexible shafts are engineered and built expressly to provide smooth, sensitive remote control.

S.S.White MAKES IT RIGHT

WRITE FOR NEW BULLETIN 5008.
It has the latest information and data on flexible shaft selection and applications.



THE S.S.White INDUSTRIAL DIVISION
DENTAL MFG. CO.

Dept. H. 10 East 40th St.
NEW YORK 16, N. Y.

AMES

NO, NO BOYS! BE ACCURATE!



CHECK IT ON THE AMES

A cost conscious restaurateur actually employs an Ames Thickness Measure to hold pie crust thickness to a uniform standard, thereby cutting down raw material waste, lowering fuel costs and assuring top quality pastry day in and day out. This unusual solution to a measuring problem is illustrative of the creative thinking of Ames engineering and design department. They'll tackle any measuring problem you may have and come up with a sound answer that will improve your quality control. Ames has built gauges to measure the thickness of potato chips, soap flakes, enamel on teeth, as well as gauges that check the sway of buildings, the stretch of bolts plus many others that solve successfully unusual and difficult applications. If you are puzzled and want an economical answer to a measuring problem, send it to B. C. Ames today.



Ames No. 1 Dial Comparator — measures objects up to 2" in cross section. Adjustable table with positive locking screw. Height 9½", weight 4 lbs., Dial Indicator graduated .001", with .250" range.

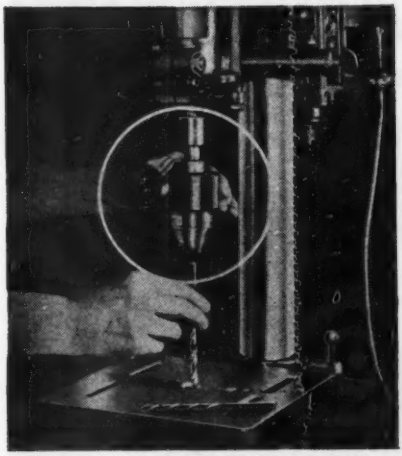
Representatives in principal cities.

B. C. AMES CO.

20 Ames Street Waltham 54, Mass.

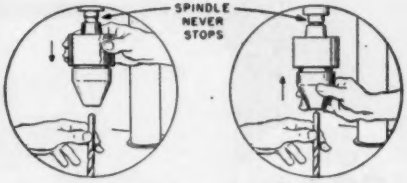
Mfgr. of Micrometer Dial Gauges • Micrometer Dial Indicators

Change drills in a second, safely with this Automatic Chuck while spindle is running



AMF Wahlstrom Chucks are rugged tools, proven out in many years of heavy production work. Simple construction assures ease of operation.

HERE'S ALL THERE IS TO CHANGING DRILLS



1. Grip sleeve—pull down —jaws open automatically —drill is released.

2. Insert new drill—push up tapered part—drill is locked in place.

You don't stop the machine to change drills with the AMF WAHLSTROM CHUCK. No keys, collets or wrenches are needed.

That's why Wahlstrom Chucks cut costly minutes in changing tools for drill press work or for spotting, drilling and reaming in boring or milling machines. They'll also save money in lathe work for burring, turning, filing, etc. *One spindle does the work of several.*

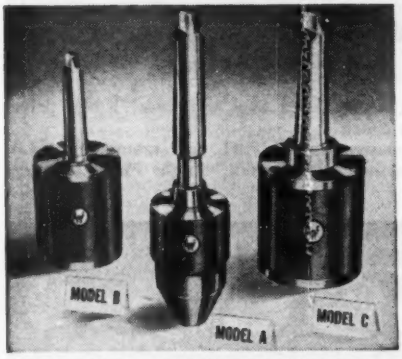
Tools last longer, too...smooth, hardened and ground jaws grip tight without chewing into tools. Grip increases with the load.

For fast, uninterrupted production, use the quick-change AMF WAHLSTROM CHUCK. It is the only fully automatic drill chuck which holds the widest range of straight shank tools... Model A—1/32" to 1/2 ; Model AA—1/64" to 3/8".

See your local distributor or write today for Bulletin 56-4

WAHLSTROM TOOL DIVISION, AMERICAN MACHINE & FOUNDRY CO.
5502 SECOND AVENUE BROOKLYN 20, N. Y.

THESE WAHLSTROM TOOLS CUT COSTS, TOO



Wahlstrom Chucks are available in several size ranges:
Model A—1/32" to 1/2"; Model AA—1/64" to 3/8"
Model B—15/64" to 1/2"; 3/8" to 3/4"; 17/32" to 1".
Model C—Holds any size tool with No. 1, 2, or 3 M. T. Shank.

WAHLSTROM
fully automatic
DRILL CHUCKS
NO KEYS, COLLETS OR WRENCHES

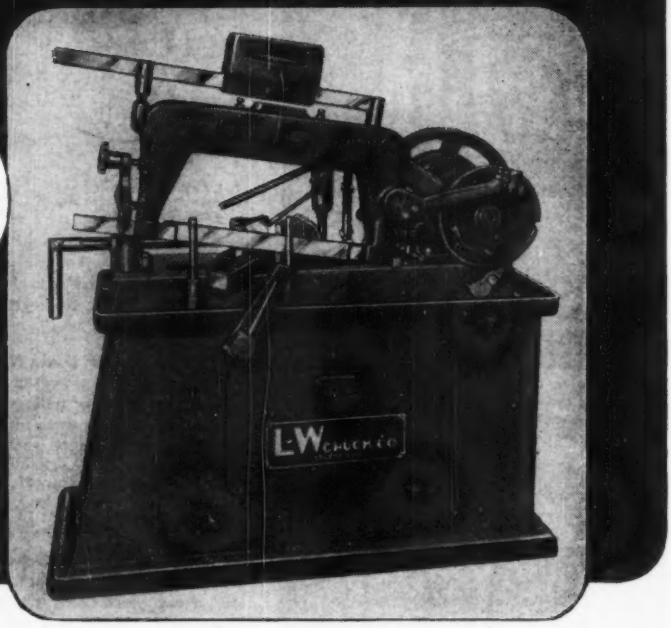
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IT HAS BEEN DONE!

WE ARE PRODUCING HIGH SPEED

POWER HACK SAWS

FOR ONLY $268.91



Stops automatically on completion of cut. Automatic relief of saw blade on non-cutting stroke. 6" x 6" capacity using 10" x 14" blades. 12" x 3" clutch pulley. Pulley speed 120 r.p.m. Coolant pump base. Swivel vise for angle cuts. All steel welded base and table. V-belt drive. Rigid frame. Gravity feed. Length gauge. Expanding clutch. 3-speed (90 to 130 r.p.m.) V-belt motor drive arrangement, $27.84, less motors. ½ H.P. 1725 r.p.m. motor recommended. Completely Motorized with Switch; Single Phase $356.95; Three Phase $363.40.

Send for complete catalog giving prices and specifications on these quality, low-cost L-W Products



L-W CHUCK COMPANY

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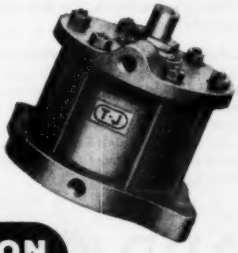
Job File No. 4617

NAILING MACHINE

feeds wood strips automatically with

T-J AIR CYLINDERS



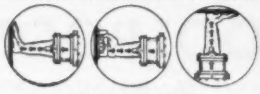


Here's a typical "push-pull" job peformed efficiently by T-J Cylinders!

This special nailing machine—equipped with T-J Air Cylinders—is built by Morgan Machine Co., Inc., Rochester, N.Y., for use by Hotpoint in Chicago. The machine is employed to make up skids for mounting electric ranges for shipment. The three boards as shown in the hoppers on top of the machine feed down one at a time while a cross piece from the hopper extended to the right of the machine is fed in. The long T-J Cylinder projecting out in front of the machine feeds the three boards ahead the proper distance and then stops to have a cross piece nailed to them. It then advances automatically to next position until four cross pieces are nailed to the three lateral strips.

For your tough jobs in power movement — pushing, pulling or lifting —*save labor, speed production* and *cut costs* with T-J Air and Hydraulic Cylinders! Many standard sizes and styles . . . both cushioned and non-cushioned types . . . 100 lb. or 50,000 lb. Precision-built, versatile, long life. Write for additional information. The Tomkins-Johnson Co., Jackson, Mich.

FOR POWER MOVEMENT IN ANY DIRECTION



100 LB. or 50,000 LB.

33 YEARS EXPERIENCE

TOMKINS-JOHNSON

RIVETERS · AIR AND HYDRAULIC CYLINDERS · BUTTERS · CLINCHERS

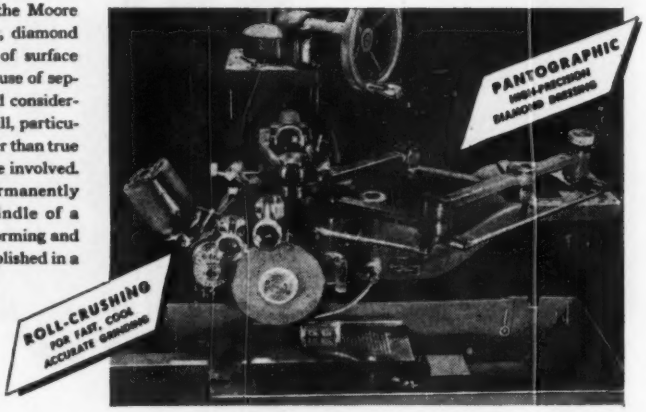
T-J

Now you can combine roll-crushing and diamond dressing in a single wheel dresser to speed form grinding

Before the development of the Moore Panto-Crush Wheel Dresser, diamond dressing and crush-forming of surface grinder wheels called for the use of separate devices. These required considerable set-up and operating skill, particularly where odd contours other than true radii and straight surfaces are involved.

Now with the Moore, permanently mounted on the wheel spindle of a surface grinder, both crush-forming and diamond-dressing are accomplished in a single mechanism.

Here's how this 2-in-1 machine does it:



1. Combines Pantograph, working directly from template, and *Roll-Crushing* in one device, accurately related to spindle.

2. Switches from one method to the other without disturbing workpiece setting or location of either trueing device.

3. No setting up of complex attachments each time wheel is dressed . . . no raising of wheel spindle from work to dress, yet wheel spindle may be raised or lowered without losing relation of wheel form to dressing device . . . crusher method saves diamond costs.

4. Assures highest roll-crushing accuracy and economy. Crusher roll is *ground* and *used* on same spindle, without disturbing position . . . no expensive machine required to grind crusher roll . . . no worry about hardening distortion, because roll is ground *in place* from the solid directly from template.

5. Takes Skill out of job, yet adds advantage of crush dressing for heavy cuts without heating work, and ultra-precision diamond dressing.

6. Device need not be removed to use machine as conventional surface grinder.

Both MACHINE DESIGN and MACHINERY magazines devoted considerable editorial space to technical discussions of the value of this ingenious new mechanism. We'll be glad to send you reprints and a descriptive catalogue on Panto-Crush.

MOORE SPECIAL TOOL CO., Inc.
728 UNION AVENUE, BRIDGEPORT 7, CONN.

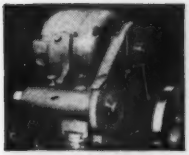


HAVE YOU BOUGHT YOUR COPY OF "PRECISION HOLE LOCATION"?

Over 5,000 copies of this valuable book on toolmaking practices have been sold to date. Available at special price of $3 in U. S. A.; $3.50 outside U. S. A. 448 pages, over 400 illustrations. 184 pages of Woodworth Coordinate Location Tables from 3 to 100 holes. Send check or money order to Moore Special Tool Co., Inc., Bridgeport 7, Conn.

ADD MOORE TOOLS TO YOUR TOOLROOM

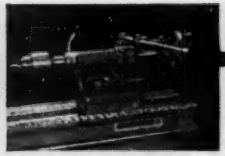
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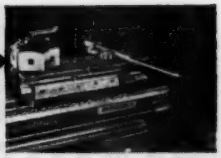
External Grinder



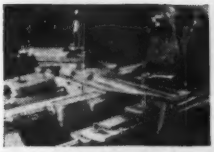
Milling Attachment



Handlever Tailstock



Handlever Bed Turret



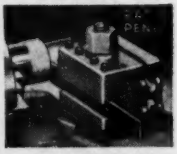
Telescopic Taper Attachment



Handwheel Collet Attachment



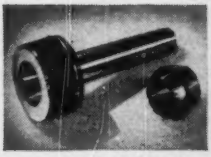
Handlever Collet Attachment



10 in 1 Tool Holder



Ball Bearing Live Center



Adjustable Collet Bushing Chuck



Square Turret Tool Block



Handlever Double Tool Cross Slide



Telescoping Jaw Follower Rest and Center Rest



Collet Rack



Steel and Brass Collets



Step Chucks and Closers



Centers and Drill Pads



Thread Dial Indicator



Micrometer Carriage Stop



Four Position Carriage Stop

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Lathe Attachments

- Cut Production Time
- Simplify Difficult Jobs
- Increase Lathe Versatility
- Speed Up Tooling
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- Reduce Operator Fatigue

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Building Better Tools Since 1906

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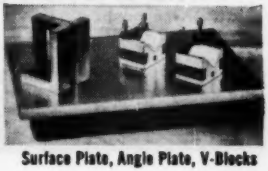
Four Position Cross Slide Stop



Safety and Standard Lathe Dogs

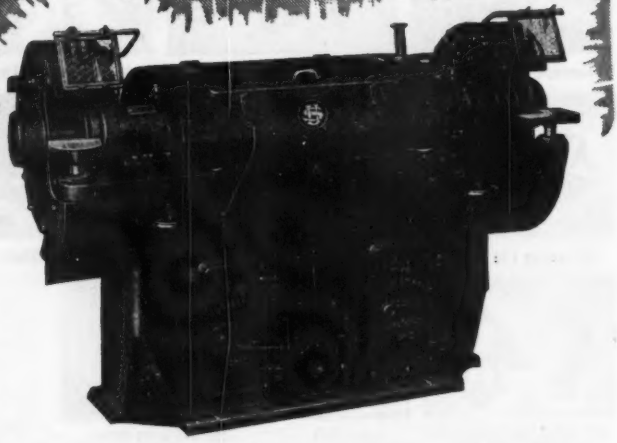


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Surface Plate, Angle Plate, V-Blocks

America's Greatest
QUALITY GRINDER VALUE



FREE FROM VIBRATION FOR UNIFORMLY QUALITY GRINDING

U. S. ADJUSTABLE SPEED SNAGGING GRINDER

Model 66 . . .
THREE SPEED CHANGES

Feed this great grinder job after job . . . put it to the most grueling tasks . . . make the most exacting demands . . . and MODEL 66 will come through with flying colors every time.

Belt drive FREE FROM VIBRATION. Speed changes to compensate for wheel wear are made by elevating motor on its hinged tray. Patented safety device prevents over-speeding. WHEEL GUARDS ADJUSTABLE TO WHEEL WEAR.

UNITED STATES ELECTRICAL TOOLS IN STOCK AT YOUR JOBBER

The UNITED STATES ELECTRICAL TOOL Co.
CINCINNATI, OHIO

PRODUCTION EFFICIENCY Depends on GOOD SEEING TOOLS



LOCALITE
THE VITAL SEEING ZONE ON MACHINE AND BENCH



MODEL 3267-H-174
Reflector orifice 5"x3⅞". Takes 100 watt A-21 medium screw base lamp. Double arm with 3 instantly adjustable joints. Overall length, 32¾". Wrinkled grey enamel finish flat oblong base. Wired with 8 ft. oil-resistant cord.

$6.12 EACH in pkg. of 6
Single Units $7.65 ea.



MODEL 3470-P-172
Reflector orifice 6⅞" dia. Takes 100 watt A-21 medium screw base lamp. Double arm with 3 instantly adjustable joints. Over-all length 48¼". Wrinkled grey enamel finish. Circular base. Wired with 8 ft. oil-resistant cord.

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WRITE for free booklet on "Balanced Lighting" and complete catalog of Localite and Generalite models.

THE FOSTORIA PRESSED STEEL CORP.
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Localites are available through selected distributors everywhere.

Better Light . . .
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Seeing conditions are a vital key to faster output, greater accuracy, lower costs on thousands of production tasks. Light on the job, exactly where light is needed, can be provided easily and economically only with flexible localized lighting. Fostoria Localites enable each worker to control and direct illumination exactly as he needs it on the vital seeing zone of his particular task. He sees easily, quickly, comfortably. The rate and quality of his production goes up — your costs come down. The low cost of a Localite is quickly returned in greatly increased production efficiency. Industrial plants, everywhere, are cashing in on Localite advantage. Check your plant's requirements, today.

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GENERALITES for Overall Lighting • LOCALITES for Light ON the Job
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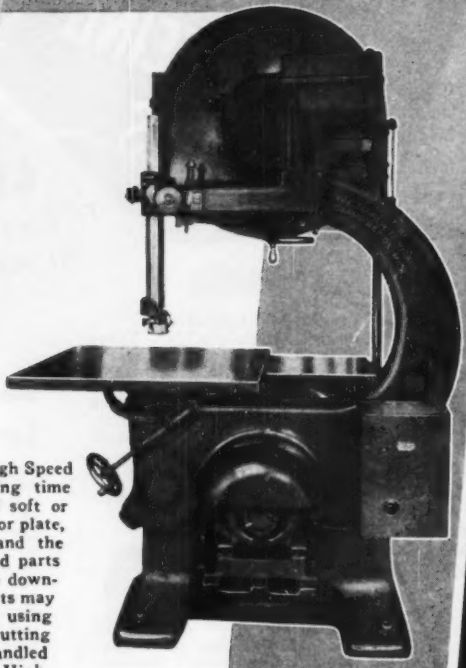


Cutting Hard-Tempered 1/8" Chrome Moley Steel



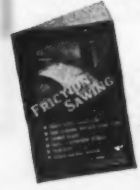
Sawing 16" Steel Piling

Greatest Cost Saver in METAL CUTTING



FRICTION sawing with Tannewitz High Speed Band Saws results in perfectly amazing time savings in the cutting of flat sheets of soft or hardened steels, non-ferrous metals, armor plate, glass, plastics, many other materials and the trimming of castings. For cutting formed parts there's nothing to compare with it. The down-drag of the saw is so negligible that parts may be trimmed or sawn as desired without using a rest of any kind. Whatever your cutting requirements, chances are they can be handled faster and at less cost with Tannewitz High Speed Band Saws.

THE TANNEWITZ WORKS
GRAND RAPIDS, MICHIGAN



***Write** for Your Free Copy on Friction Sawing*

FRICTION SAWING

with Tannewitz

HIGH SPEED BAND SAWS

INTRODUCING IN

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HAUSER

FINE MACHINE TOOLS

PRECISION JIG BORING MACHINE

Hauser Type No. 28A

A Fine Machine Tool Made With Unerring Care

Capacity 14" x 8" Readings .0001
Accuracy of slide locations .00015

Exceptional capacity of 21" between spindle and top of working table

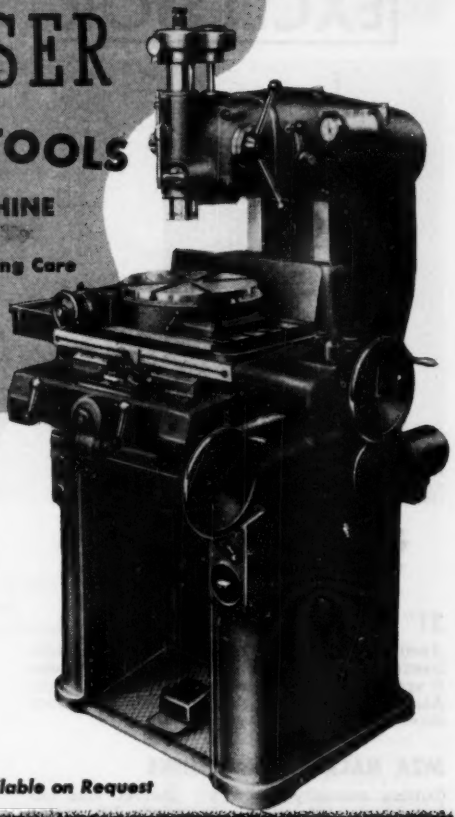
Spindle speeds range from infinite 80 r.p.m. to 3000 r.p.m.

Highest accuracy combined with exceptional output capacity

Centralized controls of utmost simplicity

Hardened and ground micrometer screws

You will be glad you looked at any HAUSER fine machine tool FIRST!



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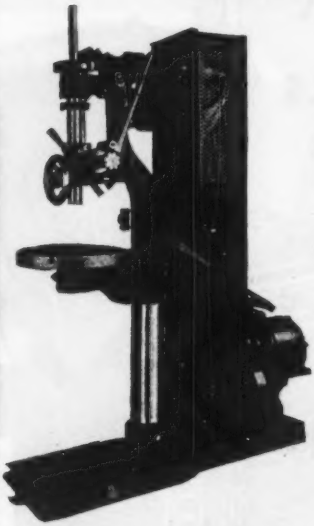
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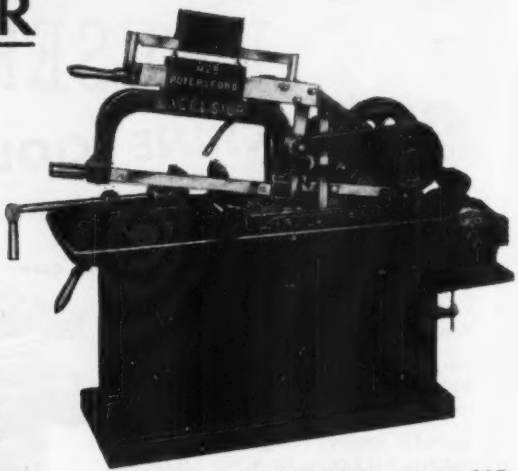


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Royersford EXCELSIOR POWER DRIVEN EQUIPMENT





M2B WET CUT HACK SAW—6"x6" CAP.

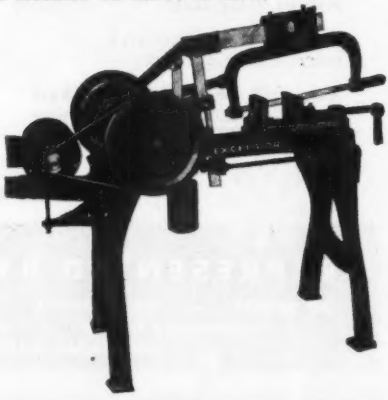
Provides low cost, efficient cutting operation. Requires floor space of only 21" x 54". Motor driven, V-Belt drive, 3 Speeds, Gravity feed. Swivel vise cutting to 45° angle and interchangeable. Coolant pump operated by cam and mounted on inside of base.

21" UPRIGHT POWER DRILL

Accurate drilling of holes up to 1½". Ball-bearing thrust on top and bottom of spindle. 8 speeds with 3 distinct and complete feeds. Also available with V-Belt instead of gear drive.

M2A HACK SAW MACHINE

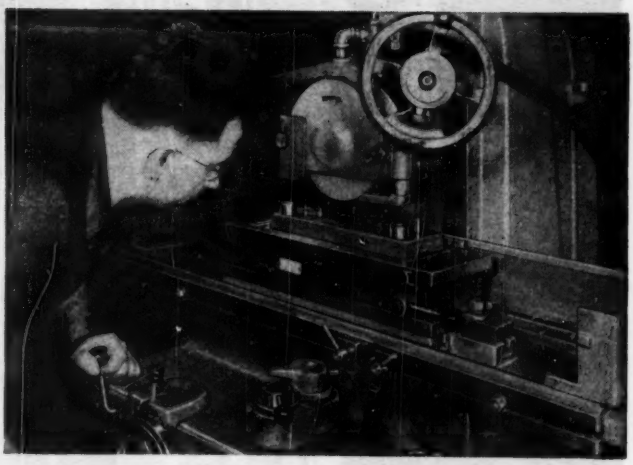
Cutting capacity, 6" x 6". Swivel vise adjustable to 45° angle. Automatic lift, motor driven V-Belt drive. Automatic shut-off, gravity feed. Here's a powerful hack saw which is rigidly constructed and reduces costs in hundreds of plants. Send today for informative literature on ROYERSFORD equipment. No obligation.



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Tinnerman Products, Inc. of Cleveland, Ohio, manufacturers of Speed Nuts, use a No. 25 Grand Rapids Hydraulic Feed Surface Grinder in their toolroom. Here their Model 25 is shown grinding a combination die.

You will appreciate the micro-inch finish produced at production speeds on Grand Rapids Grinders. All Grand Rapids Hydraulic Feed Surface Grinders have these outstanding features:

1. **One-piece column and base casting for vibrationless rigidity**
2. **Precision ball-bearing spindle which is greased for life**
3. **Bijur one-shot lubrication system eliminating hand oiling**
4. **Patented vertical movement of wheel head for quick, accurate adjustments**
5. **Portable coolant tank for ease of coolant replacement**
6. **Vane type hydraulic pump for fast longitudinal table travel**

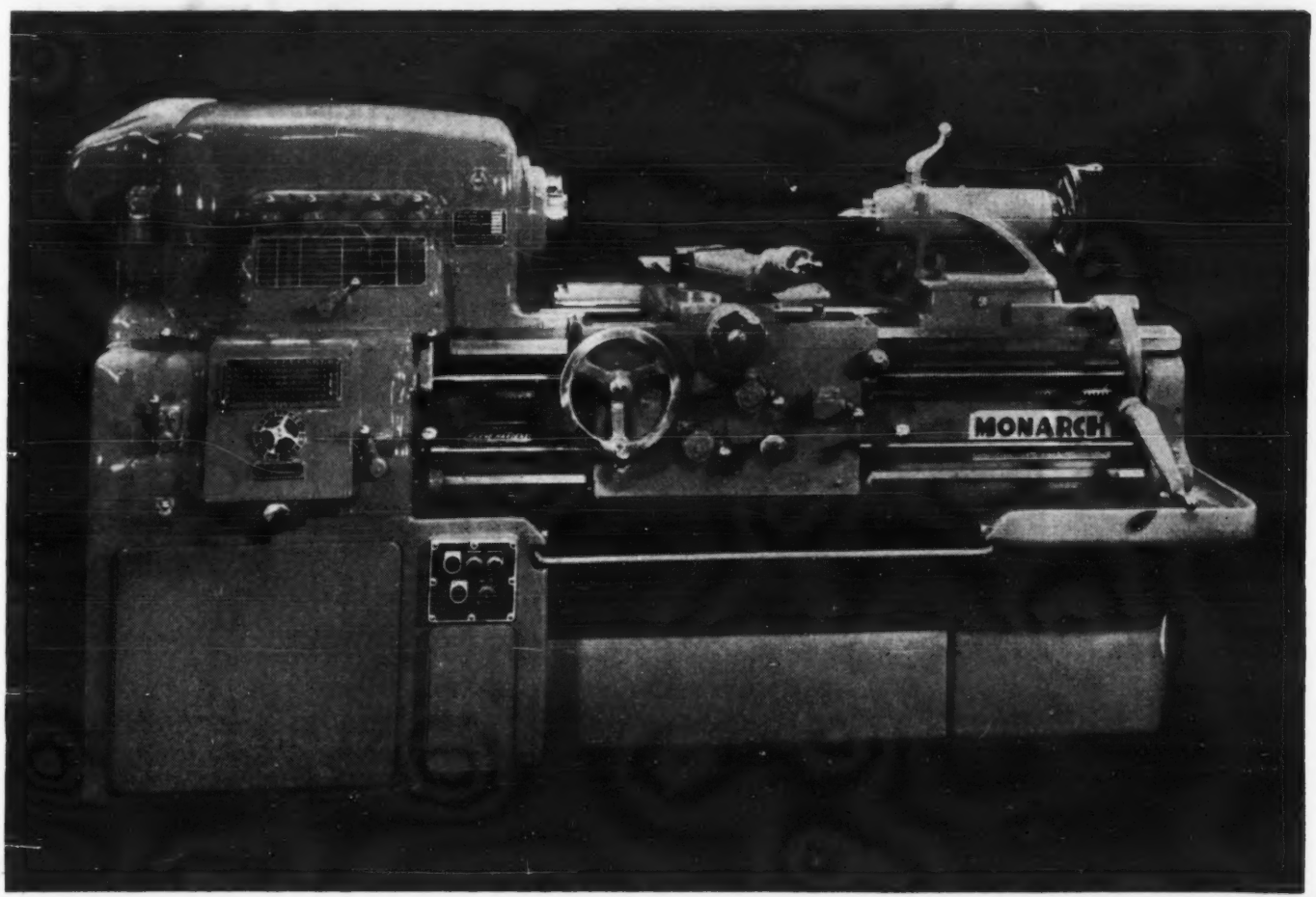
to serve you—

Your inquiry concerning your specific grinding needs will receive prompt attention. Grand Rapids Grinders include: Hydraulic Feed Surface Grinders, Universal Cutter and Tool Grinders, Hand Feed Surface Grinders, Drill Grinders, Tap Grinders, and Combination Tap and Drill Grinders.

GRAND RAPIDS GRINDERS

GALLMEYER & LIVINGSTON COMPANY

405 Straight, S. W., Grand Rapids 4, Mich.


MONARCH

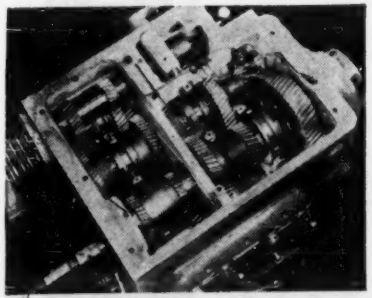
—at its best on Series 60 Lathes

You'll get peak power—and long life at original accuracy in the—headstock of every Series 60 Lathe. Its extremely efficient design is characterized by two outstanding features, both pioneered by Monarch.

First, is the use of helical gears—all made of hardened alloy steel, and with ground or shaved tooth contours. The result is quieter, more efficient operation, with less waste power, less wear (and, as a result less down time).

Equally important is the extra-wide design of the Series 60 headstock gears. Not only is there more tooth contact at all times, providing more efficient transmission of power—but shifting is easier and faster (with less gear wear) by means of clutches instead of shifting the gears themselves.

An almost integral part of Monarch's superior headstock design is the American Standard Camlock Spindle Nose—a distinct advantage because of easier, faster, more rigid, more accurate mounting of chucks and fixtures.



Monarch Series 60 Headstock Gearing

These and many other design and construction features mean more savings with Monarch's Series 60 Machines, available in 14", 16" and 20" sizes. For complete information ask for Booklet 1113.

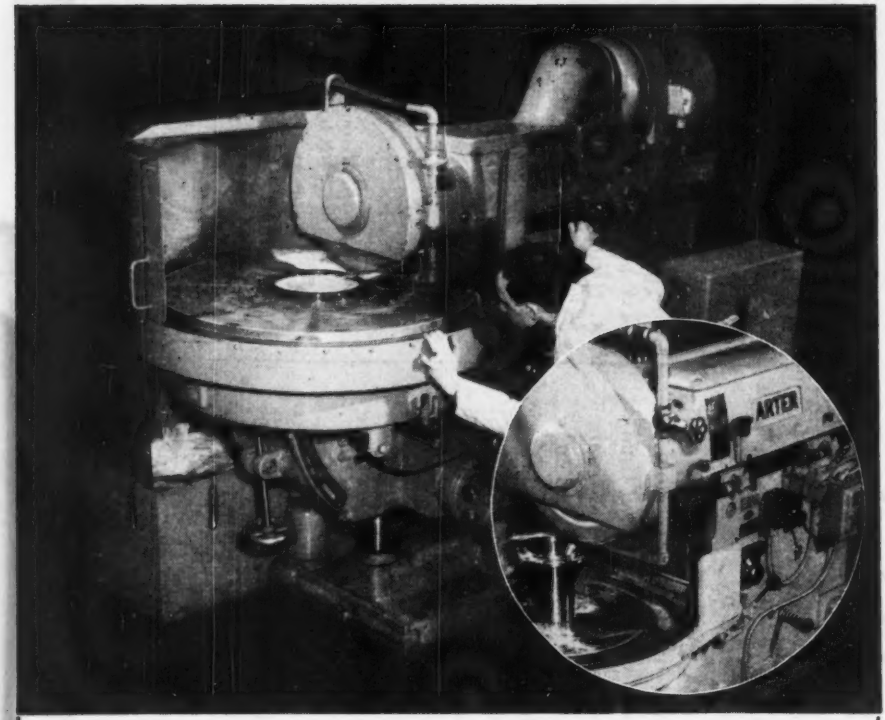
You'll Save on Maintenance and Operating Expense With These Series 60 Features:

1. Totally-enclosed gearbox and end gearing—preserves accuracy.
2. Automatic pressure lubrication—insures long life at original efficiency.
3. All anti-friction bearings—for peak power and less maintenance.
4. Hardened, ground or shaved, wide helical gears in headstock—for precision power, easier shifting.
5. American Standard Camlock Spindle Nose—for quick, rigid chuck and fixture mounting.
6. Flame-Hardened and Ground Bedways—preserves accuracy—proved on over 25,000 Monarch Lathes.
7. Induction hardening of many critical parts—for long, trouble-free life.

ACCURACY · ECONOMY · LONG LIFE

Monarch TURNING MACHINES

THE MONARCH MACHINE TOOL CO. • SIDNEY, OHIO



Grinding Parts For Jet Engine On ARTER Rotary Surface Grinders

Shown here are two Arters at the well-known AVRO CANADA PLANT. Extreme accuracy, finest finish, uniform precision are musts for their work . . . Many jobs, such as shown, require both surface grinding and diameter grinding at the same chucking . . . Easy with an Arter as a finefeed arrangement can be supplied to accurately move the wheelhead by hand as well as hydraulically. Grinding is done with the side of the wheel.

ARTER
GRINDING MACHINE CO.
WORCESTER, MASSACHUSETTS • U. S. A.

MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE *Lo-swing* PEOPLE" SENECA FALLS, NEW YORK

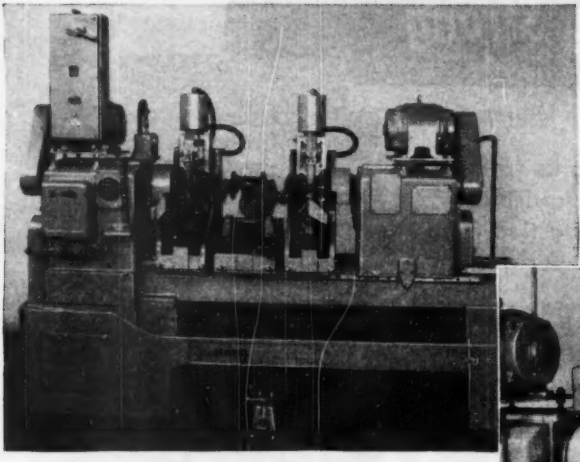
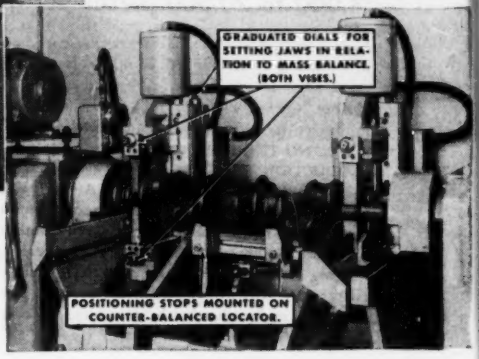


FIGURE 1. Vises are positioned vertically to facilitate loading and unloading heavy crankshafts.

FIGURE 2. Counter-balanced positioning locator stops raised against cheeks to position crankshaft for accurate depth of centers.



IMPROVED LOADING METHOD SPEEDS UP *Lo-swing* CENTERING OPERATION ON HEAVY CRANKSHAFTS

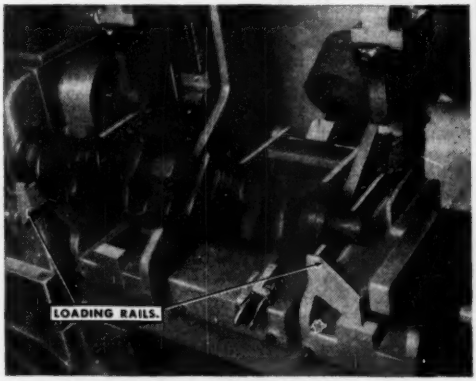
Problem: To reduce operator fatigue in centering both ends of heavy crankshafts in relation to center of mass balance.

Solution: The Model "CS" Lo-swing Automatic Centering Machine selected for this job was equipped with vertically-designed air-operated vises, fitted with built-in loading rails. (Fig. 1).

In operation, the first crankshaft forging of the lot is centered with all jaw adjustment dials set at zero. The crankshaft is then centered and tested for mass balance in a balancing machine, after which fine adjustments are made on the vise jaws. The machine is now ready for a production run of a particular type of crankshaft. Depth of the two centers in relation to the cheeks is accurately maintained by the counter-balanced positioning locator stops shown in Fig. 2. With these vertically-positioned vises, the operator merely sets the crankshaft on the loading rails and pushes it forward until it drops into position in the open vise jaw. (Fig. 3)

Lo-swing engineers are at your disposal to assist with your handling and machining problems.

FIGURE 3. Vise jaws open to level of loading rails... no lifting required to remove crankshaft from vise jaws.

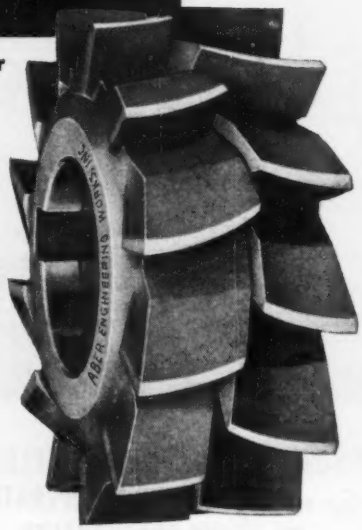


SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.

PRODUCTION COSTS ARE LOWER WITH *Lo-swing*

OVER 20,000
and Still Going Strong

...With An Aber Curved Tooth Milling Cutter



Objectional chatter marks from standard type cutters surprisingly resulted in increasing production from 4,000 to 20,000 pieces per grind

Eight months ago a manufacturer experienced difficulty in obtaining a smooth surface on a side milling operation while using standard type cutters.

Aber "Curved Tooth" right and left hand shear side milling cutters were recommended to eliminate chatter marks. NO THOUGHT WAS GIVEN TO INCREASING PRODUCTION.

The results proved outstanding — After eight months of continuous operation, without once removing the cutters from the machine, Aber "Curved Tooth" cutters produced 20,000 pieces against previous peak outputs ranging between 3,000 and 4,000. In addition the cutters are still producing pieces within specified tolerances and with a finish finer than that obtainable with NEW standard type cutters.



Here Are the Facts

OPERATION DATA

MACHINE: U. S. Multimiller

TOOL: Aber "Curved Tooth" right and left hand shear side milling cutter. 3"x⅜"x1¼"

MATERIAL: Bronze Turbine Blades.

COMPARATIVE PERFORMANCE

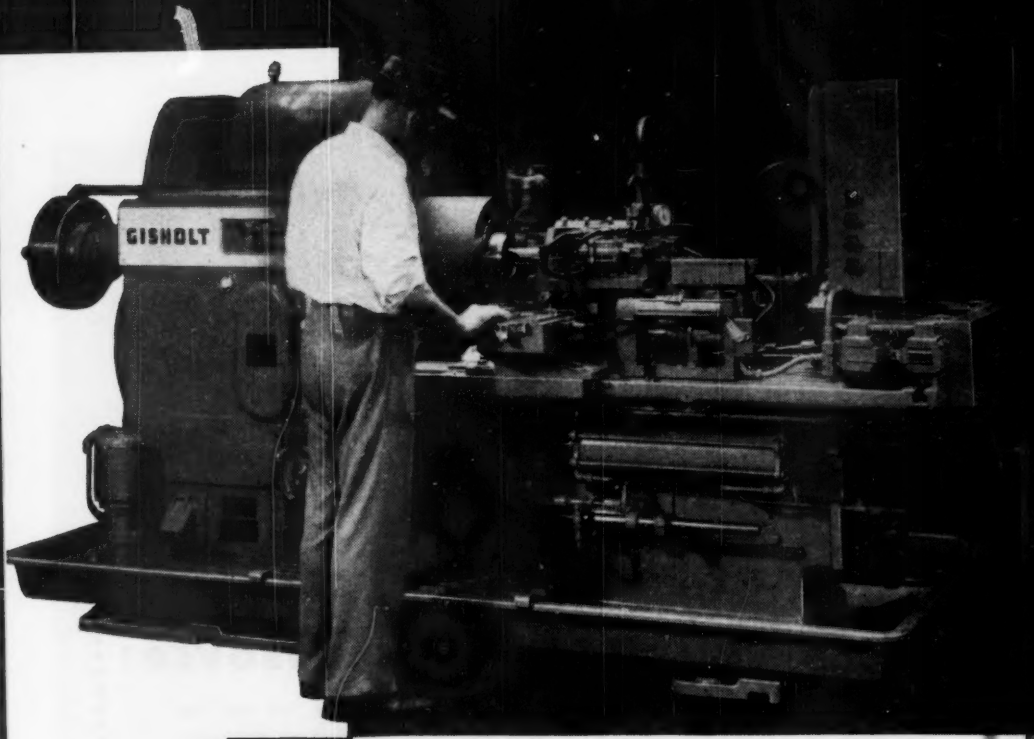
	ABER CUTTER	STANDARD CUTTERS
S. F. M. Speed:	400sfm	400sfm
Feed per Rev.:	16" per min.	12" per min.
Depth of Cut:	⅛"	⅛"
Pieces per Grind:	20,000 and still going strong	3,000 to 4,000 maximum



You too can profit by applying Aber "Curved Tooth" milling cutters for increased production and reduced rejections due to off-tolerance, unsatisfactory finish milling operations. Remember every Aber Tool has the exclusive, patented "Curved Tooth" design providing chatterless, smooth cutting action.

ABER

ENGINEERING WORKS INC.
WATERFORD, WISCONSIN



HOW 8 SIMPLIMATICS

cut machine time 50%
cut man hours 75%

The way you can slash costs with the Gisholt Simplimatic often surprises some of the most experienced production men.

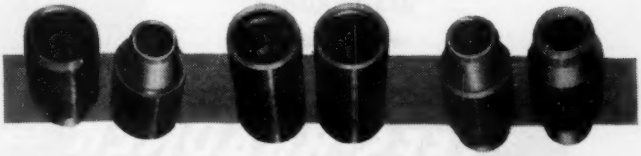
Here's a big shop which found that 8 Simplimatics could take over the job done on 16 other machines. And it takes only 4 operators instead of 16 to turn out the volume of parts required.

Not the least in the cost picture is the machine itself. For the basic Simplimatic design permits you to individualize the machine to a high degree to solve many different problems. Thus, for many jobs you can have all the advantages of a special machine merely with special tooling. Yet it's all done on a Standard Simplimatic—at far lower cost.

The importance of lower costs these days makes it important for you to get all the facts about Simplimatic Automatic Lathes.

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In producing these tool joint pins and boxes, the 8 Simplimatics work in pairs with fully automatic operation; one man can easily tend two machines.

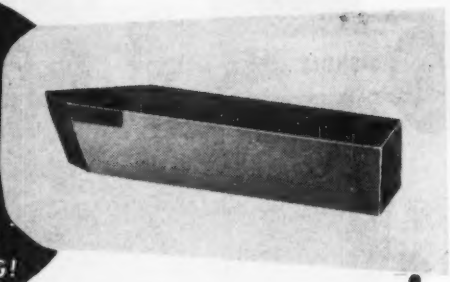
Ask about the many different arrangements possible on the Standard Simplimatics with platen table, vertical head, etc.

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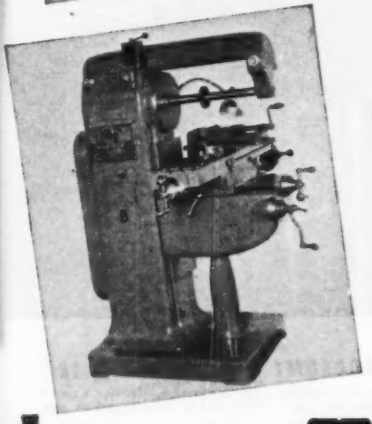
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511

MAKE **INDEX** *Your Choice*

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Whether it be the heaviest jobs or light production, you will find these improved, low-cost machines ideal for the purpose. They offer speed and precision to meet present-day stepped-up schedules, while assuring a substantial saving in time and labor. Get details about their many advantages now.

Model 55 IMPROVED VERTICAL MILL. A speed range of 80 to 2700 RPM's combines with a 1 H.P drive, 3¼" quill, and extra rugged spindle mounted on over-size precision ball bearings to give a capacity of ⅛" to 1½" end mills in steel. Spindle quill travel is 5¼" either by lever, hand wheel, or power, and has adjustable positive stop and automatic safety throw-out. Table 40" x 9" or larger. Longitudinal table power feed has 8 geared feed changes.

Model 60 PLAIN HORIZONTAL MILL. A full No. 1, that in many ways equals or exceeds a light No. 2 in capacity. Low maintenance due to all rapid moving parts running in oil, hardened alloy gear train, and fully ground alloy steel spindle mounted on pre-loaded precision ball bearings requiring no adjustment. Standard table 40" x 9" overall, with larger table optional, is supported by 18" of saddle bearing, and has accurately ground lead screws for transverse and longitudinal movement. Constant flow coolant system of 8 gallon capacity starts and stops with spindle.

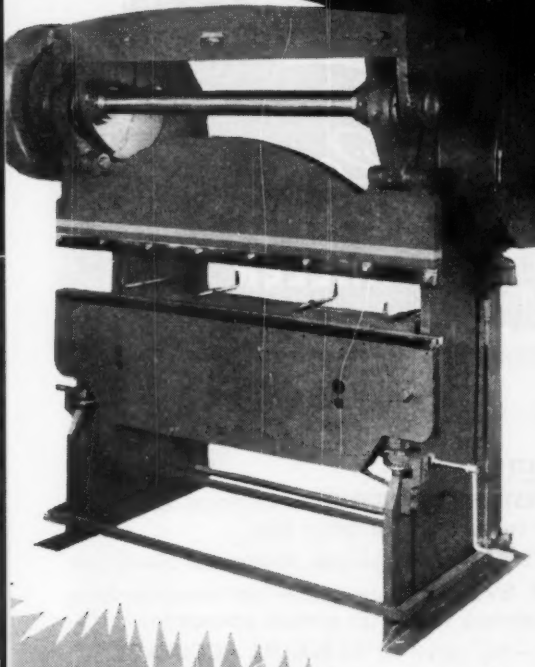
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TYPE "300"



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A Press Brake made to exacting standards and built to take hard and continuous use.

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Variable speed drive for speed and safety.

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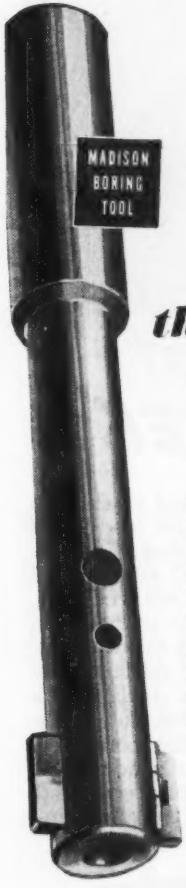
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★ **UNIQUE—VERSATILE.** Nothing else like it. One or several machines can be the answer to some of *your* production problems.

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50 YEARS OF SERVICE TO INDUSTRY





the "holes in our heads" are full

. . . OF COST-CUTTING IDEAS

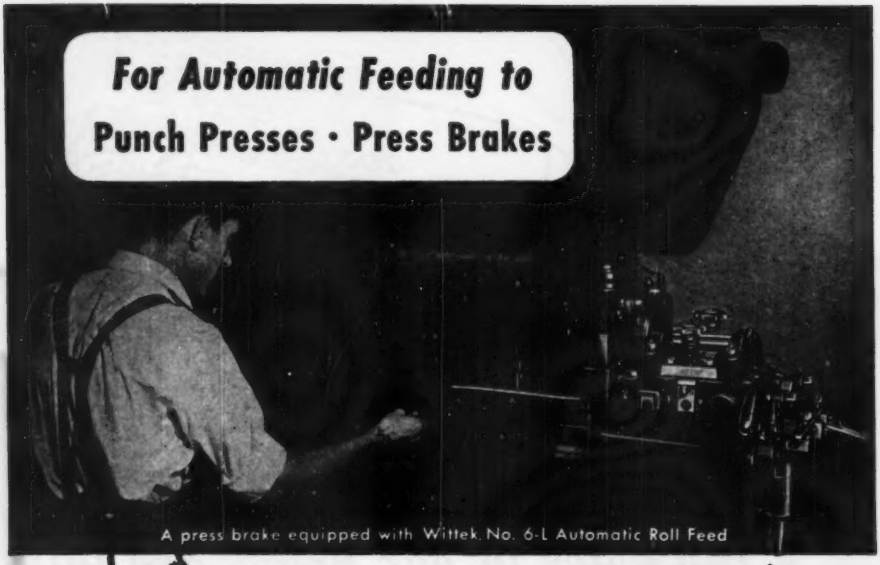
Yes, the "holes" in our engineers' heads are full of ideas to give you newer, faster, lower cost methods of boring . . . methods that save you time and money. If your job needs a special bar or special cutter, we'll design and make it. Chances are a standard Madison cutter in the right Madison bar will give you greater production economy. The Madison line, built over a period of thirty-five years, is broad enough to fit nearly any boring requirement. Let Madison's experienced boring specialists . . . the "men with holes in their heads" . . . help you cut your boring costs. Submit your problems for recommendations by our problem solving tool design department. Of course there's no obligation.

Write for the information filled Madison Catalog. It is yours for the asking.

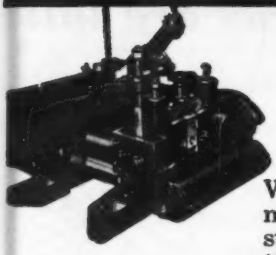


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For Automatic Feeding to
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A press brake equipped with Wittek No. 6-L Automatic Roll Feed



You Can't Beat WITTEK

Wittek Roll Feeds are made in standard models to meet every requirement in the automatic feeding of strip stock to punch presses or press brakes. The distinguishing feature is their simple and economical method of operation which does away with complicated parts thereby assuring *speed* and *accuracy* in the feeding of various kinds and thicknesses of material.

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ROLL FEEDS AND
REEL STANDS

120 to 150 pcs. per min.

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AUTOMATIC THREAD ROLLER

Completely Automatic Feed
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Table Top Working Level
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Embossing Dies
(female shown)

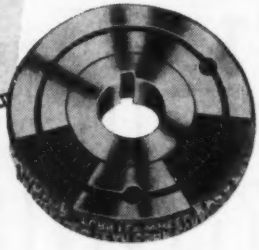
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MTBB

DECEMBER 1950

featured in this issue

How To Utilize the Possibilities of the Pantograph, by Ira R. Ogilvie. Instead of being the small machine for handling work of limited size, the author points out that the modern application of this machine lends itself to work of large as well as small sizes. Users can utilize the possibilities of the pantograph with beneficial results. Page 73

An Inexpensive Indexing Drill Jig, by Robert Mawson. This is described by the author as a fool-proof drill jig. It operates easily and quickly. Mr. Mawson has had considerable experience with jigs and fixtures. Page ..88

Special Report on Automatic Screw Machines is the seventh in a current series of special reports on modern machine tools. Reprints of previous reports are available. Page ..104

Increase Screw Machine Production With Planned Tooling and Attachments, by William F. Schleicher. It is possible to increase production by utilizing a planned tooling program, by arranging the tooling sequence efficiently, and by using attachments wherever possible. The author describes the process and illustrates his thoughts with actual case histories. Page 104

Cost Estimating on Screw Machine Products. How to estimate work for screw machines and arrive at a safe and sound estimate regarding probable cost. Page 128

You Can Use Carbides on Automatic Screw Machines. While it is quite true that the use of carbides on screw machines is still in its beginning, enough work has been done by the machine tool builders and the carbide manufacturers to indicate the trend carbide tooling should take. Page 130

Late Models Automatic Screw Machines. A description of late model automatic screw machines as manufactured in the U.S. Page 138

Specifications of Automatic Screw Machines. All the models, types of machines built in America, listing specifications and other pertinent data. Page 151

Letter from Great Britain, written by Robert Hutcheson, editor of Machine Shop Magazine, London, Great Britain. Page 161

The Problem of Conferences, by Ed Mottershead. How do you handle selling, problem-solving, and planning conferences? Page 179

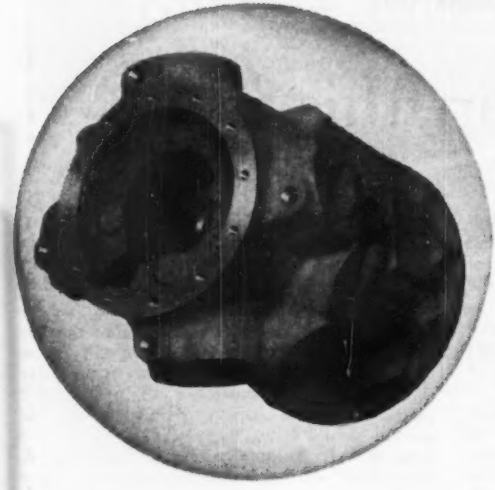
DEPARTMENTS AND OTHER FEATURES LISTED ON PAGE 5

TRAINING PROGRAM AND JOB INSTRUCTION PROGRAM

A special series of exclusive articles by Ed Mottershead will appear in the MACHINE and TOOL BLUE BOOK beginning with the January issue. Topics to be discussed include: How To Plan and Develop In-Plant Training Programs; Break Down the Job if You Want More Production; Job Instruction in Four Easy Steps; Job Methods Training Increase Production. Mr. Mottershead has had a lifetime of experience in increasing production through efficient and intelligent handling of workers. His series of special articles should prove both timely and helpful.

Beginning with the January issue

One a minute-

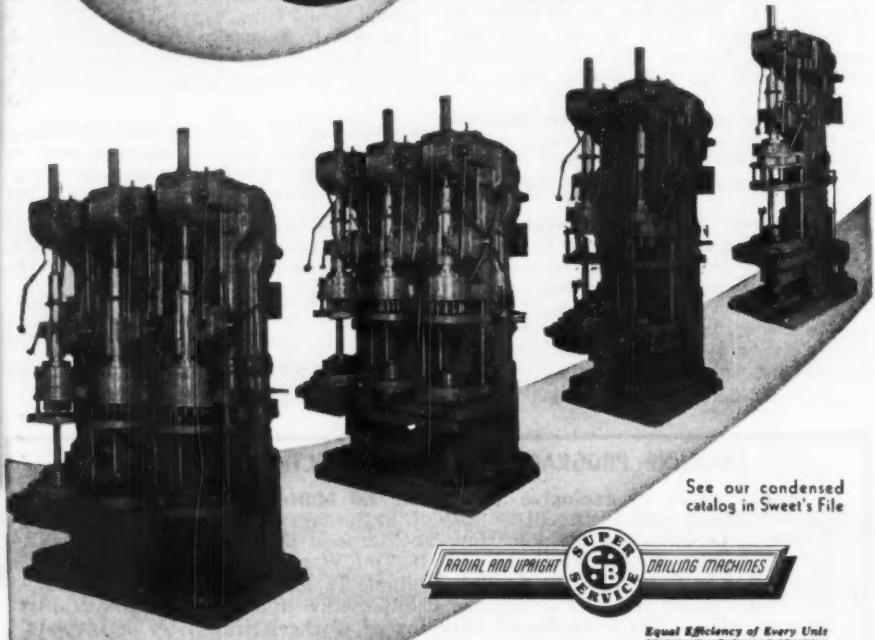


This battery of highly productive 21" and 24" Cincinnati Bickford Super Service Direct Drive Drills is drilling 24—.257" holes; tapping 24—$\frac{5}{16}$" holes; step drilling 4—$\frac{13}{32}$" x $\frac{7}{16}$" diameter holes $1\frac{3}{8}$" deep; tapping 4—$\frac{5}{8}$" holes in this crank case housing.

The operations are performed on both ends of three sizes of castings. All operations are completed at the rate of one a minute.

These Direct Drive Drilling Machines are made in the following sizes: 21" with 3 or 4 horsepower motor; 24" with 5 or $7\frac{1}{2}$ horsepower motor; 28" with $7\frac{1}{2}$ or 10 horsepower motor.

Write for Booklet U-27 for complete description.



See our condensed catalog in Sweet's File

RADIAL AND UPRIGHT SUPER SERVICE DRILLING MACHINES

Equal Efficiency of Every Unit Makes the Balanced Machine

THE CINCINNATI BICKFORD TOOL CO. Cincinnati 9, Ohio U.S.A.

MTBB
DECEMBER 1950

as the editor sees it

Machine Tools, Handle With Care

The machine tool industry has at present about five times as many orders on hand as it had a year ago. This is good, for the builder and for the buyer. It would not be out of place, therefore, to investigate exactly what a buyer receives when the railroad dumps a pile of crates on his doorstep, with large letters on the side of the boxes: "Machine Tools, Handle With Care."

There is no single benefit derived from the use of modern machine tools, but rather a multitude of benefits which spread into every department of the plant.

To the personnel manager new tools ameliorate the manpower problem. Instead of three men wrestling with three clunkers, one man can twirl the dials on two or more machines, or one machine can breeze through the work of the three replaced moss-backs. Labor is freed for other jobs.

The maintenance man need no longer hover over the superannuated old granddads like a frightened nurse, keeping his charges wired and taped together for just one more deep breath. There is little maintenance on new tools. Put this in the profit column, especially on the wire and tape that's saved.

To the tool engineer new machines are versatile enough to take to the tooling which the toolers dream up to further boost production.

To the works manager new tools give the production curve a shot in the chart. His nightmare of coaxing and pleading more production out of machines of declining productivity is banished. The new tools will deliver the goods.

The sales manager need no longer hem and haw to customers over deliveries and wonder why the plant can't get the stuff out as estimated. Modern machine tools live up to their promises.

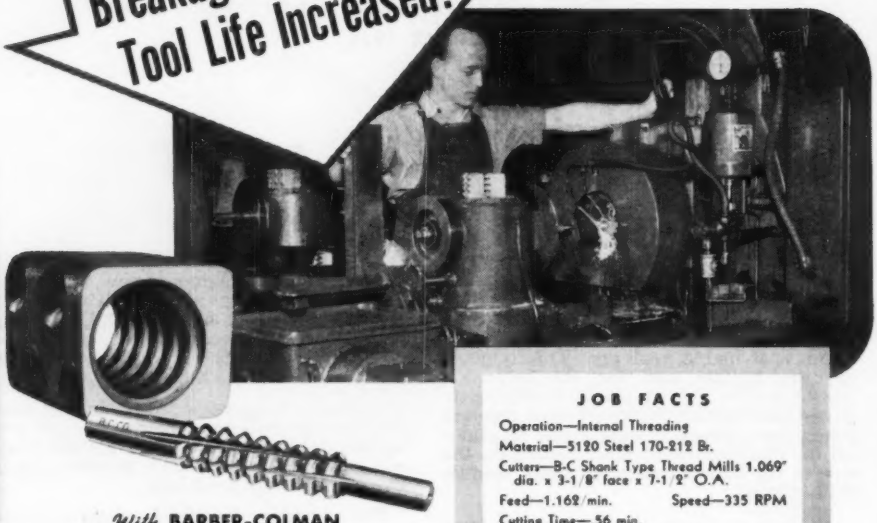
The president can face creeping mobilization and the dark unknown days ahead with the confident thought that he and his men and his machines are ready. This readiness, in its way, is a resounding blow for liberty and democracy. It's also good for insomnia.

The chairman of the board has added to the value of his plant. Further, he has bought production insurance. Whatever the future holds, it holds nothing as terrifying as this: to be faced with the ultimatum of doubling or trebling output and nothing to do it with but a battery of arteriosclerotic groaners.

Have we painted too rosy a picture? No. Nothing has been said of increased profits. Of savings in dollars and cents. Of increased indirect labor efficiency, or reduced tool costs. We haven't mentioned the money you save by throwing out the old and substituting the new. For it's true: the old machines are chomping away at your profits today, tomorrow, next week, next month, next year, and will continue to do so until you throw the parasites out.

William F. Schleicher

Breakage Eliminated! Tool Life Increased!



With **BARBER-COLMAN**
JOB-ENGINEERED FORM CUTTERS

JOB FACTS

Operation—Internal Threading
Material—5120 Steel 170-212 Br.
Cutters—B-C Shank Type Thread Mills 1.069" dia. x 3-1/8" face x 7-1/2" O.A.
Feed—1.162/min. Speed—335 RPM
Cutting Time—.56 min.
Tool Life—350 pcs./sharp.
10,500 pcs./cutter

More production with less tool cost is the record on this job. Small diameter internal threads with special form require a tool with a long cutting face, capable of removing a large amount of metal at high speed. The heavy chip load causes vibration which, on conventional type unsupported thread cutters, results in frequent breakage and poor tool life.

Barber-Colman cutter engineers designed a special tool with extra clearances and an outboard pilot support to steady the cutting action. Now cutting time has been reduced to .56 minutes per piece and tool life has reached the remarkable level of 10,500 pieces per cutter.

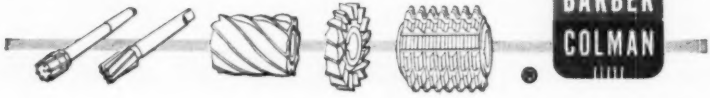
Cutting tools built to fit the specifications of the job always pay off in lower tool costs and lower production costs. That's why we'd like to show you what Barber-Colman Job-Engineered Cutters will do on your next job.

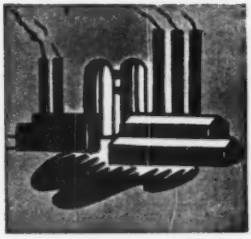


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DECEMBER 1950

How's Business

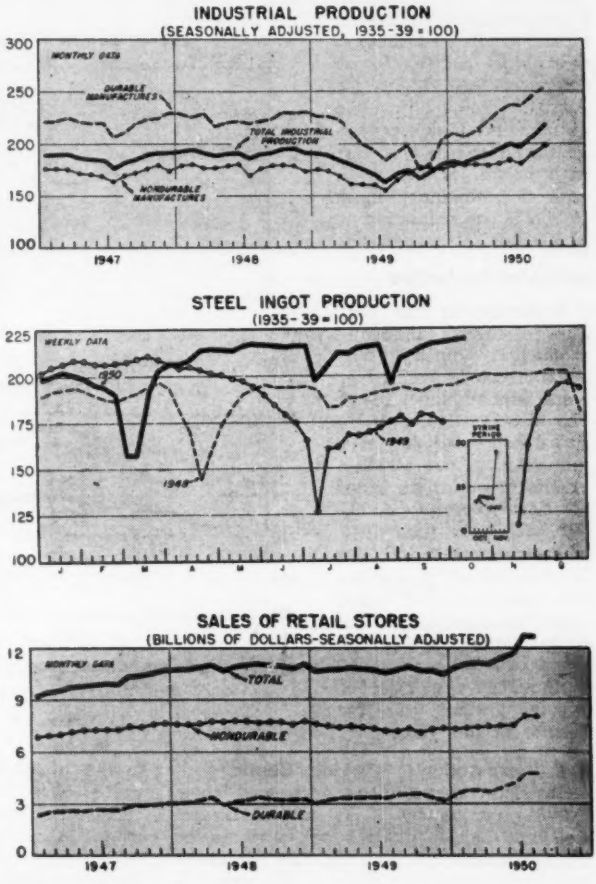
Steel is Up!

American Iron & Steel Institute has just released figures stating that production of steel in September and for the first nine months of 1950 have attained an all-time high. The production of ingots and steel for castings reached 8,200,020 net tons in September, a good 1,600,000 tons higher than the output for September 1949. Considering the tremendous volume of output which American steel plants reached during the critical years of 1943-1944-1945, during World War II, when "the heat was on." the above figure is highly significant of the immense potential volume which may be expected in the ensuing months.

N.M.T.B.A. Report

The recent annual meeting of the N.M.T.B.A. in Toronto disclosed some interesting information as to the stepped-up volume of orders for machine tools which are flooding the manufacturers. Every plant which needs units of machinery for potential future use seems to be climbing on the bandwagon at once, with the result that the machine

GENERAL BUSINESS INDICATORS



source: Dept. of Commerce

tool builders are having to promise delivery dates of from six to eight months in the future.

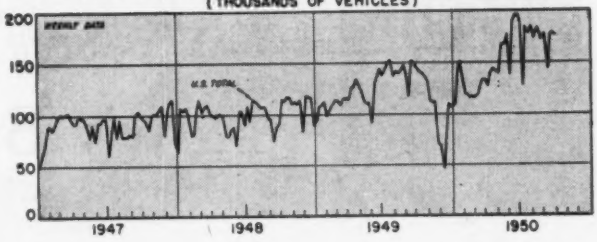
The above is borne out by information just received, to the effect that the total percentage of new orders received of machine tools, has reached the astonishing mark of 307.3% (100% being based on average shipments for 1945-1946-1947). The preliminary figures available for foreign orders for August show a new high of 34.1%, as compared with 18.8% for August 1949. Shipments of machine tools for August also reached a new high figure for the year, with a preliminary mark of 93.7%, as compared to 67.3% for August 1949.

Industrial Production

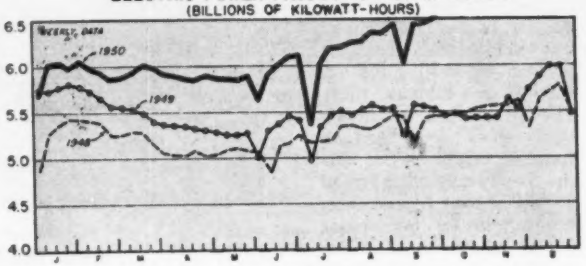
According to The Wall Street Journal, "Industrial production during September rose to its highest point since June, 1945." The Federal Reserve Board estimated that total industrial output for September stood at an index of 213 (average 1935-1939=100). In June 1945, at the close of World War II, the industrial production index was 220, based upon the same norm. The highest rate which the gross national product hit during 1949 was $258,800 million during the first quarter of the year.

GENERAL BUSINESS INDICATORS

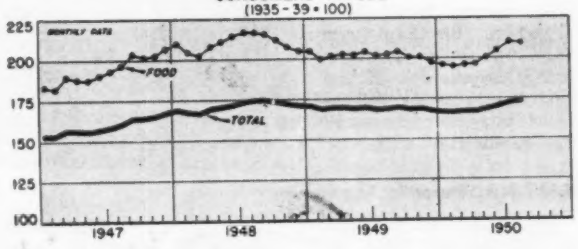
MOTOR-VEHICLE PRODUCTION (CARS, BUSES, AND TRUCKS)
(THOUSANDS OF VEHICLES)



ELECTRIC POWER PRODUCTION BY UTILITIES
(BILLIONS OF KILOWATT-HOURS)



CONSUMERS' PRICES
(1935-39=100)

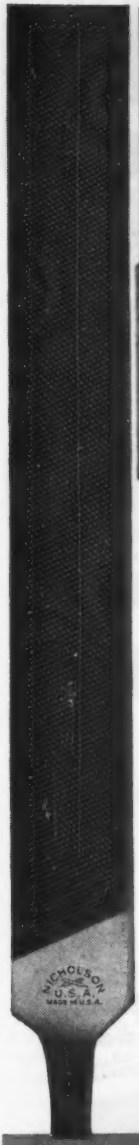


source: Dept. of Commerce

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High Corporation's Working Capital

American corporations increased their working capital by $2,300 million during the 2nd quarter of 1950 to a record of $73,800 million by June 30. The Securities and Exchange Commission stated that the increase resulted from a rise in current assets of $4,900 million; this was only partly offset by a $2,600 million gain in current liabilities. By "working capital" is meant the difference between current assets and current liabilities; "current" items are those which have a rapid turnover in business operations.



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Carson Picked to Administer Controls

David B. Carson, vice president in charge of sales for Sharon Steel Corp., will shortly take a leave of absence to head the iron and steel division of the National Production Authority of the Department of Commerce, according to a recent announcement by William H. Harrison, administrator of N.P.A.

The new N.P.A. order will contain percentage limits on the total amount of "DO" (defense orders) rated that each steel producer will be required to accept. No producer will be obliged to accept priority orders which exceed 25% of his alloy steel production in a specified base period.

Oil Production Demands Up

The Independent Petroleum Association of America estimates that the demand for petroleum products for the next six months will be up approximately 7.7% above 1949-1950. The association claims that current production and imports are more than adequate to meet the requirements.

Credit Curbs

The recently announced regulations governing the amount of down payment and the length of time required to pay off the balance have already cut into sales, retailers say. Appliance stores, which require 25% down instead of 15%, are feeling the pinch. Auto sales are showing a slight slow down. Generally speaking, the hard goods lines are feeling the effects of the credit restriction more than the soft goods lines.

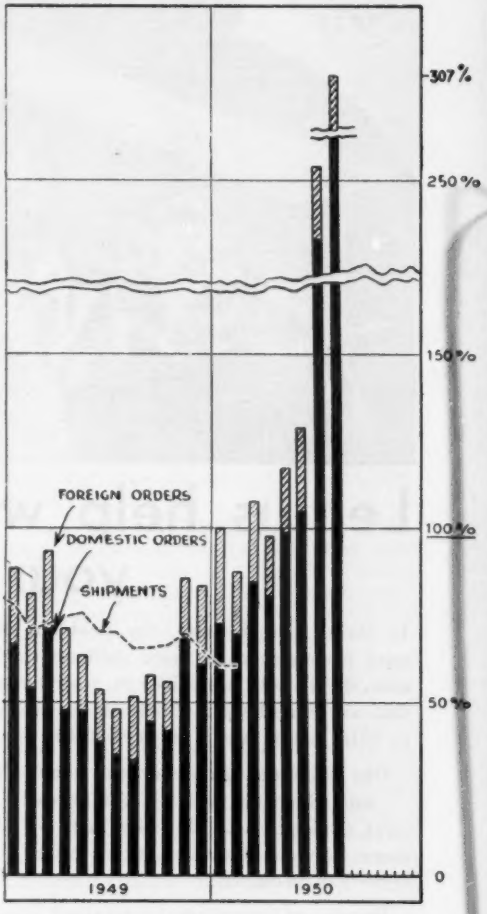
However, not all of the troubles are traceable to the credit restrictions. Unwarranted price hikes by the get-rich-quick fraternity has discouraged some buyers. Higher income taxes which have reduced the available money, coupled with the 12% rise in the cost of living, has squeezed the poor consumer to the point where he thinks twice about buying expensive hard goods.

Britain Tightens Export Curbs

Export controls of molybdenum and other materials needed for the British defense program were drastically tightened by Great Britain. Licenses will henceforth be required to ship molybdenum, nickel, spent oxide, sulphur and certain sulphur mixtures.

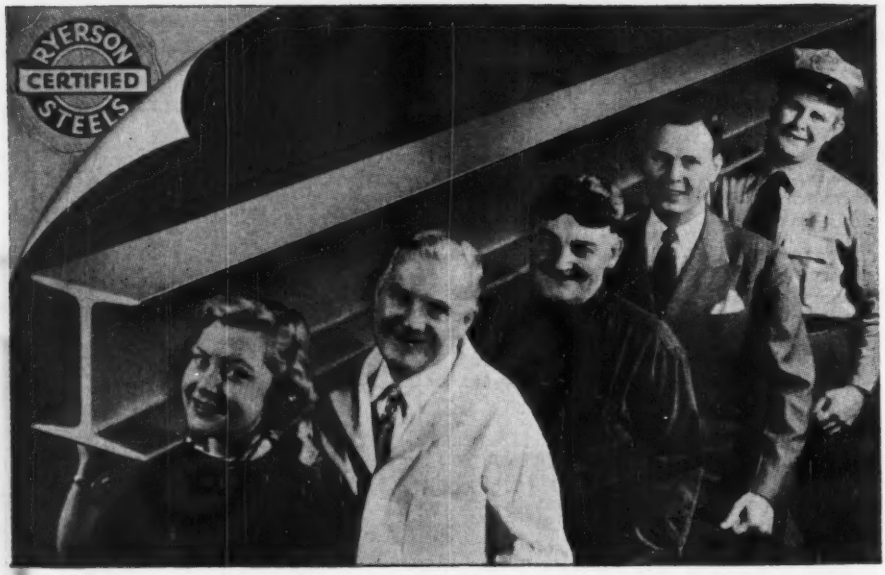
Some steps have been taken to tighten export restrictions on machine tools which have been finding their way to countries behind the iron curtain.

MACHINE TOOL SHIPMENT CHART
A quantity comparison between 1949 and 1950



source: National Machine Tool Builder's Association

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RYERSON STEEL

how to utilize possibilities of the PANTOGRAPH

BY IRA R. OGILVIE

Traditionally, the pantograph has been a small machine designed for work of limited size. This one fact has had much to do with the present lack of appreciation of the possibilities inherent in pantography. The author, in this article, endeavors to help the reader to a better realization of the uses and possibilities of pantography.

What Is A Pantograph?

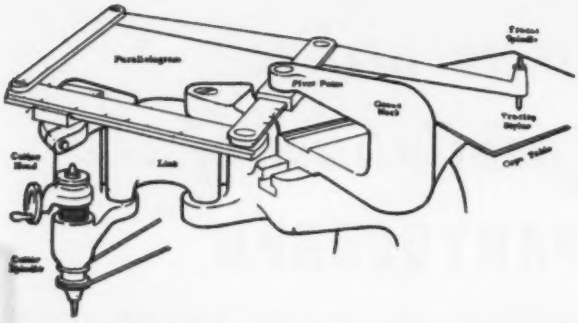
The pantograph may be defined as a high-speed vertical spindle machine used to mill or engrave in metal or plastics to precision standards through a reduction ratio. It would seem to have the characteristics of a conventional vertical mill. However, the conventional vertical milling machine has a fixed spindle and a moveable spindle and a fixed work table and, in addition, a fixed copy or master table. Both the work table and master table can be adjusted laterally and vertically but they are usually locked in position during operation.

The most important variation from conventional machine tool design is the pantograph mechanism or linkages. These linkages usually consist of four bars which form a parallelogram as shown in figure 1. This illustration applies to the Gorton 3-U 2-dimensional pantograph which is of traditional pantograph design as well as to other pantographs on the market which are of the same general description. Special or limited purpose machines of which the pendulum type is one as well as some newly designed models may vary in design or construction details.

These links which form the parallelogram make possible the reduction ratio between the size of enlarged master, pattern, or template, and the work piece. This reduction ratio is peculiarly characteristic of the pantograph.

One of the pantograph bars, or links, is longer than the other three. The tracing stylus is located at the far end of this long bar. Next, the cutter spindle is located immediately under a slider block which is attached to the pantograph link or bar which runs parallel to the long bar mentioned above. Then, another slider block is mounted on the bar which is in between the tracing stylus and cutter spindle and which is at right angles to the tracer spindle bar. This second slider block is attached to a bracket at the central pivot point of the entire mechanism. These three elements—tracer spindle, pivot point, and cutter spindle—must always be in a position so that a straight line can be drawn through their centers in order to produce work which is not deformed or distorted.

Ratios from 1 to 1 to as great as 100 to 1 or more are provided by adjust-



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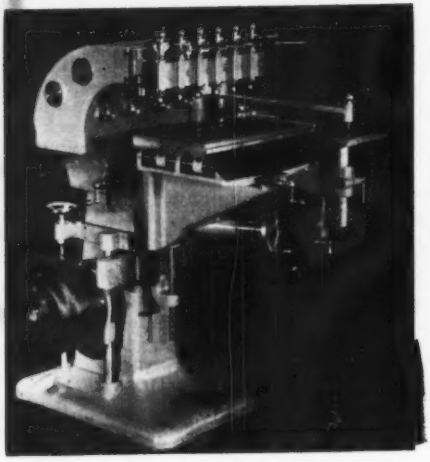
Fig. 1. Schematic drawing of conventional pantograph mechanism for 2-dimensional work.

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ment of both slider blocks to correct positions on the two pantograph bars. These pantograph bars bear engraved calibrations for the ratios of reduction most often required, but almost any ratio of reduction can be arrived at by using a simple formula to locate the slider blocks in their correct positions. On some 3-dimensional pantographs it is necessary to set four slider blocks instead of two. Precise settings are often made with gauge blocks after the correct settings have been determined by formula.

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Fig 2. Multiple spindle pantograph (2-dimensional) with fixed spindle heads and movable work table. All spindles are belt driven from one motor.

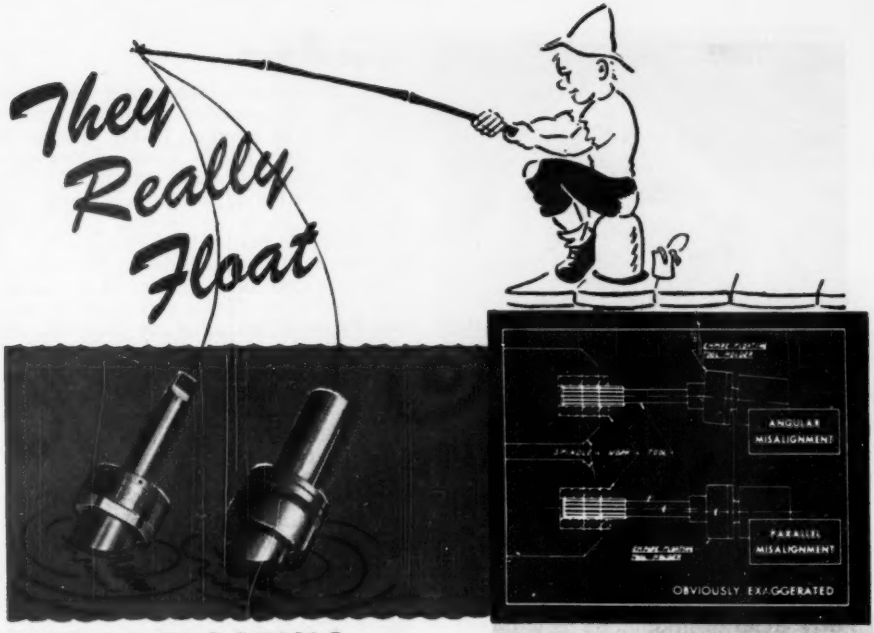


The work table of a pantograph is located beneath the cutter spindle. This table normally resembles the table on a knee tvne milling machine and has T-slots used for clamping the work piece in place. The master table is located under the area normally covered by the tracing stylus. This table can be flat, with or without T-slots, depending upon the type of master to be used, or it may be a special type of holding fixture. Ordinarily, the kind of master table or holding fixture purchased is determined bv the type of work to be done on the machine.

The aim of the pantograph builder is to design and construct a machine which is rugged enough for the work to be done and one which is as accurate and sensitive as it is possible to make it. Therefore, almost invariably the pantograph is belt driven and provides numerous speed changes up to as high as 15,000 or 20,000 rpm. Speeds up to from 50,000 to 75,000 rpm can be made available by substituting a direct drive spindle with integral motor or one of several standard air spindles. Also, to provide sensitivity with accuracy, there is a considerable amount of hand fitting during machine assembly, and only the finest anti-friction bearings are used, at least on the better machines—they must function freely but without any looseness or play.

The work piece or blank is mounted on the work table and the enlarged master is clamped on the master table. The correct ratio of reduction is set by adjustment of the slider blocks and both cutter and tracer are inserted in cutter and tracer spindles.

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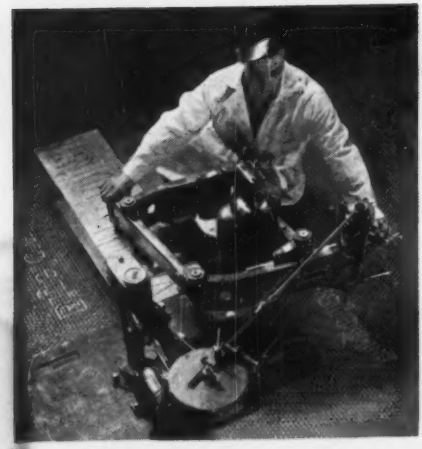


Fig. 3. Milling trade mark designs in hot press plate used in embossing large rug pads.

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Ratio Relationships

It is important to emphasize at this point the relationship between the stylus and cutter. Let us first assume that the ratio of reduction has been set at 10 to 1 on the machine. This means that the master has been constructed ten times larger than the work piece will be when finished. Therefore, the ratio between the tracing **operation** and the cutting **operation** must be at a 10 to 1 reduction also. One method of accomplishing this is to use a tracing stylus ten times the diameter of the cutter. When this is impractical, another method is available. The master is enlarged beyond its original 10-times size and the tracing stylus is reduced proportionately in diameter but—and this is important—the center-to-center distance between master and tracer must still remain ten times the center-to-center distance between cutter and work piece. Another bit of technique is that of using a slightly over-size stylus for all preliminary cuts. This leaves a small amount of stock on the work piece until the finish cut is taken when the stylus is changed for one of correct proportional size according to one of the two methods just described.

Scope of Work

In the past, pantographs have been built to be operated manually, cutting one piece at a time. Today, due to the demand for lower costs, faster production and automatic operation, pantographs are being built in more and more instances with automatic and semi-automatic features. Pneumatic or hydraulic-operated holding fixtures and controls have been employed in numerous instances. Motorized masters, various types of scanning mechanisms, cam controlled cutter feeds and automatic indexing have also been used successfully along with multiple cutter spindles driven by belt from a single motor or by individual motors, figure 2. On many pantograph models motorized masters are quick interchangeable with manually traced masters, thereby adding to the versatility of this machine and minimizing idle time.

The question is often asked: "What is the size of pantograph?" Generally speaking, there is no size limitation. There are table model pantographs weighing perhaps from 30 to 50 pounds and there are pantographs weighing in excess of 10,000 pounds. The scope of work likewise varies widely. A standard model pantograph has been used to engrave the Lord's Prayer of approximately 300 characters within a circle five-thousandths of an inch (.005") in diameter and another standard model has been used to mill the intaglio design in scoring plates, which emboss designs in rug pads, of approximately 10 by 20 feet in size, figure 3. Other models have been used to cut designs on the surface of rolls and cylinders up to 30 inches in diameter by 12 feet long, figures 4 and 5.

In view of the reduction ratio usually employed, the question naturally comes up as to how large a master must be constructed for such large size work pieces. In cases such as these, perhaps only a section or segment of the over-all design can be used for the master. After completion of one segment, the work piece, the master, or the pantograph itself, is moved to the next position until the entire job is finished. In cases where work is being done on rolls or cylinders, the work

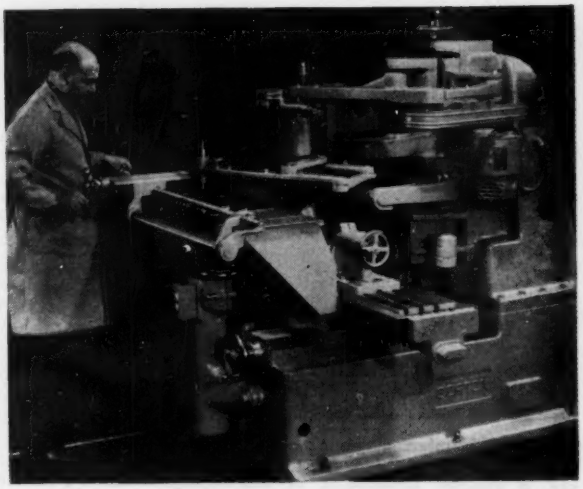


Fig. 4. Special 2-dimensional pantograph for machining intaglio designs in steel die-cutting and embossing rolls from 6" dia. and 12" long to 12" dia. and 40" long. Note scanning attachments used for roughing cuts. Machine weighs 10,650 pounds. Time saving over previous methods estimated to be several months.

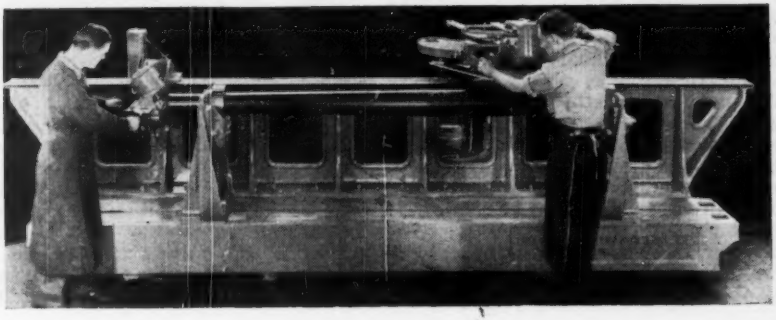
piece is usually indexed to the new position.

Another measurement of the scope of work encompassed on the pantograph machine is to mention a few specific examples which should be familiar to many as to size and general description. Standard model pantographs, or adaptations of them have been used in work on alphabet molds for alphabet soup, breech blocks and breech rings of heavy artillery pieces, figure 6, fire interrupter cams for aircraft machine guns, fraternity rings, 18-foot propellers for heavy bombers, table silver, plastic spectacle frames, cookie molds, forging dies and many more diversified products throughout industry.

Speed and Accuracy

Speed and accuracy are two of the principal reasons for the growth of pantography. Quick "set-up," especially for short runs, is accomplished by constructing a relatively simple enlarged master of wood, brass, aluminum, plastic, or even carboard in some cases. This master can be complete or merely a segment; it can be flat, curved, or irregular in shape, figure 7. It is made several times larger than the finished work piece to tolerances determined

Fig. 5. Special pantograph for use in work on gun barrels or other tubes, cylinders and rolls up to 30 dia. by 12½ feet long. This shows the engraving operation at right and graduating cross lines on gun muzzle on left.



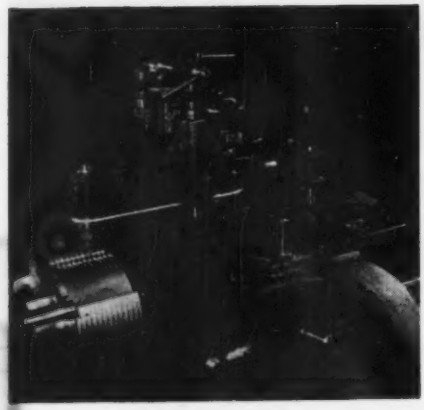


Fig. 8. Chamfering ends of interrupted threads on breech block 10 155 mm howitzer, a special adaptation of pantograph work in 2 dimensions and a 1 to 1 ratio with fixed cutter spindle and stylus and moveable master table. Time saved amounted to 85%.

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by the individual job requirements. When this master is traced by the tracing stylus on the machine, the cutter is actuated by the pantograph linkages working at the ratio of reduction previously set into the machine and follows the exact shape and contours of the master but in the finished size desired. Accuracy and tolerances in the finished work piece benefit from this reduction ratio.

What Accuracy Can Be Expected?

The pantograph is just as much subject to inaccuracies contributed by the human element and the machines used in its construction as any other machine tool. However, it has two advantages one of which is not present in any other type of machine.

In the first place, the pantograph employs a master, pattern, or template. So does a lathe or milling machine which has been fitted with a copying attachment or follower. When operating inaccuracies or errors are discovered and measured in either type of machine, the master may often be altered to compensate for the known operating error. It would be a remarkable achievement to be able to say that this can always be done. The fact is that in a few cases, this is not possible. The next question is: "What is there about a pantograph which distinguishes it from other machine tools when accuracy is an important issue?"

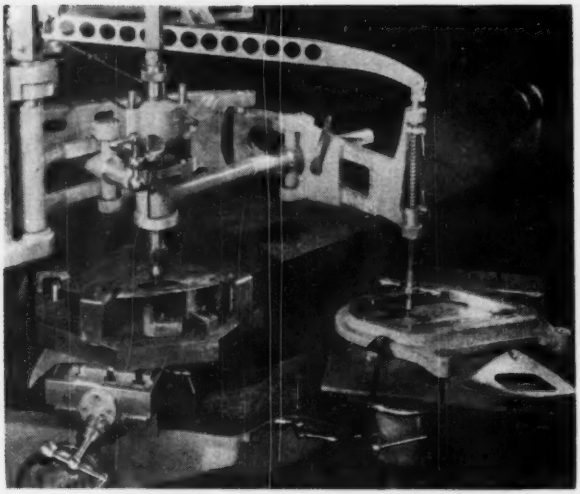
This is the place where the pantograph demonstrates its unique advantage which is found in no other mechanical device: the pantograph operates at a reduction ratio! This one feature sets it apart from all other machine tools, even including other tracer controlled machines.

Whenever it is possible to alter the master to compensate for the operating inaccuracy of a pantograph, we have, as additional help, its reduction ratio. This reduction ratio increases accuracy in direct proportion to the ratio of reduction. Therefore, if the ratio of reduction is 3 to 1, you will achieve three times the accuracy of the master and three times the accuracy possible with any machine which must operate at a 1 to 1 ratio. If the ratio of reduction is 10 to 1, accuracy will be increased ten times over that of the master or the 1 to 1 tracer controlled machine. Naturally, these statements apply only to machines of comparable capacities, weights and sizes.

Repetitive Accuracy

It is equally important when thinking in terms of high production output to know that a high degree of repetitive accuracy is characteristic of the pantograph. Once the ratio of reduction has been decided upon, the master suitably designed and constructed, the cutter sizes and types determined, the speed and feeds (when using motorized masters) properly calculated and the number of roughing and finishing cuts established, every single succeeding work piece coming off the machine, whether ten minutes later or two years later, will be identical to the original work piece.

Because the pantographic method makes it possible in many cases for the user to compensate for any existing machine error by intentionally deforming the master, we can say that the pantograph is the only machine that will produce greater accuracy at the cutter point than is fed into the machine at



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Fig. 7. 3-dimensional pantograph cutting and rounding the edges of an irregularly shaped opening in tip of 9-foot aircraft propeller blade of very tough steel. Notice simple enlarged master. Former time of 5 hours was reduced to 40 minutes.

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the tracer point. This, of course, is due to the increase in accuracy which is in direct proportion to the ratio of reduction employed.

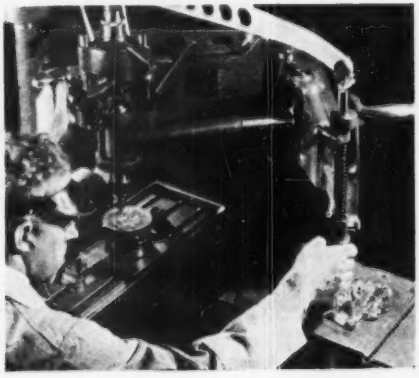
From the above, it can be seen that a standard pantograph built by a reputable manufacturer is capable of providing more accuracy in work for which it is fitted than any other type of machine. In addition, there are many operations in the metal working field today which, because of their shape, size, or inaccessibility cannot very well be performed on any other machine but a pantograph. This is just one more illustration of the machine's adaptability and versatility. Figures 8 to 14 show some interesting pantograph operations.

Another advantage of a reduction ratio is that tool and dies steels can be readily machined without undue effort on the operator's part because of the well-known principle of leverage. At a 10 to 1 ratio, the operator exerts only one-tenth the effort which would be necessary at a 1 to 1 ratio.

A word of caution is advisable here. The pantograph is not a "cure-all." It is more complicated than many other conventional machine tools and it frequently presents apparently baffling problems to its users which have resulted in a skeptical attitude in the minds of a few. Close adherence to the manufacturer's instructions and familiarity with the characteristics of the pantograph, however, have made possible enormous savings in production time and costs wherever the pantograph has been put to work.

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Fig. 8. 3-dimensional pantograph cutting embossing die from a 3-times oversize master model. Machine is set at a 3 to 1 reduction ratio.



Low Cost of Operation

Another advantage in pantography is that exacting work can be done by relatively inexperienced operators. As an

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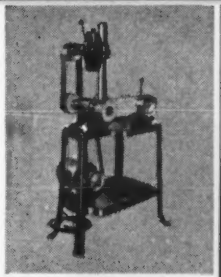
Belt Finishing Machine
- - - - - - $135.45



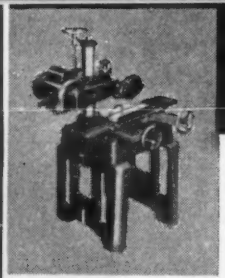


Delta-Milwaukee Tool Grinder with Safety Shields (bench model)
- - - - - - $99.50
(floor model) - $124.50

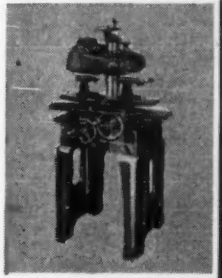
The Grinder with built-in goggles



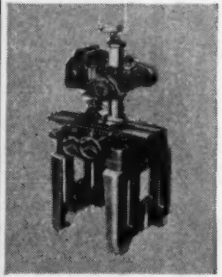
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Fig. 9. High precision cam contour mill designed to make use of reduction ratio principle without pantograph linkages. Notice enlarged master cam, the tracing stylus feed cam adjacent, and work piece under the cutter spindle. Master cam and work piece rotate in unison on tandem rotary tables. Like many other pantograph applications, this one is entirely automatic within the cutting cycle.

example, an operator of little or no experience or skill in die making can do a better job faster than a highly skilled die maker can accomplish by some other method. Short runs can be economically handled by pantography because masters can be so easily and simply constructed. For long runs, more durable masters are used and, in many cases, the pantograph can be converted to semi or completely automatic operation. In cases like the latter, one operator can tend several machines at a time.

Briefly stated, pantography adds precision and increases production at minimum cost in many of the following operations when working with ferrous or non-ferrous metals as well as with plastics and other newly developed materials: profiling, routing, die sinking, mold cutting, counterboring, chamfering, machining, drilling, grooving, graduating, slotting, engraving and calibrating—in all cases where the work piece is either flat, uniformly curved, cylindrical, spherical, or irregular in shape—either 2-dimensional areas or 2-dimensional solids.

The pantograph can be used to reduce, enlarge, reverse, or invert, either at a 1 to 1 ratio or at any ratio within the limits of the machine. These operations are likewise exclusive to pantography.

Today, the pantograph is a single purpose or multi-purpose machine on the production line just as often as it is a special purpose machine sitting in the corner of a tool room or experimental department.

Variations and Adaptations

There is one more unusual advantage of the pantograph method which should be mentioned here. This advantage results from the fact that the pantograph principle, on the one hand, can be

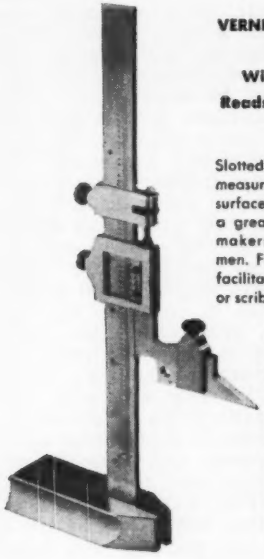


Fig. 10. Standard 2-dimensional pantograph milling buckets in turbine ring of stainless steel. Manual operation with sectional master. Indexing accomplished with rotary table. Time saving over any other method is approximately 40 hours or better.

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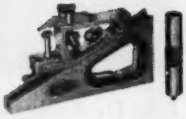


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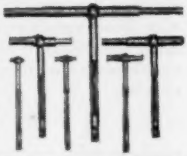
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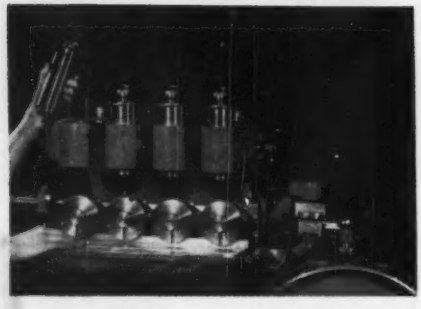


Fig. 11. 2-dimensional pantograph fitted with four direct drive removable spindles having top speed of 45,000 rpm. Machine has fixed spindles and movable work table and was designed to mill figures on four numbering wheels at a time from one master.

• • •

readily adapted to varying requirements and, on the other hand, the reduction ratio can be employed for certain classes of work without the pantograph mechanism. When the latter method can be used, a much more accurate machine can be designed. This is because the pantograph linkages are not required.

In addition, there are several successful variations or adaptations of pantography in use today which may not be too generally known.

SEWING MACHINE—One is the sewing machine found in many department stores which quickly and expertly embroiders names or initials on linens, men's shirts, toweling or any other fabric while you wait. Standard copy type or the actual signatures of the buyer is used as the master and a pantograph mechanism is employed to transfer this into the sewed design.

FORM GRINDING—The pantograph machine has also become valuable in dressing grinding wheels to various shapes and forms where the finished metal work piecs must be form ground to very accurate limits and with exceptionally high surface finishes. The pantographs used for this work are not "general purpose" machines, but are usually designed for this type of work only. They, therfore, feature refinements over and above what are required on so-called standard machines. To mention just two of these refinements: in many instances the machines are designed so that the cutter and tracer heads swivel around their centers synchronously so that the more intricate contours and angles of the grinding wheels can be formed by the diamond point. Also, optics are often built into these machines in order to take full advantage of their accuracy.

TORCH CUTTING—For some time, the conventional pantograph mechanism has been employed in sheet metal cutting. Metal sheets, either single or multiple, of almost any thickness can be cut with oxygen torches to various shapes more satisfactorily than by sawing or milling. In work of this kind one tracing stylus following one master may actuate several torches at a time, thereby multiplying production output.

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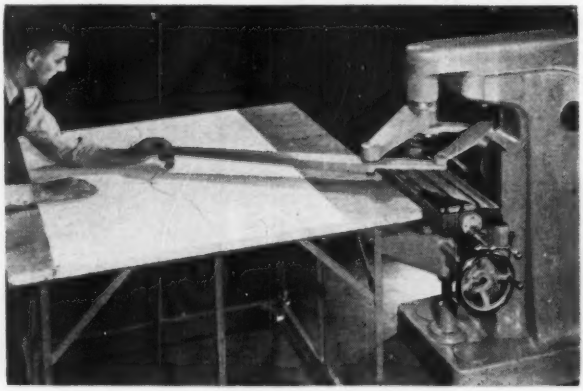
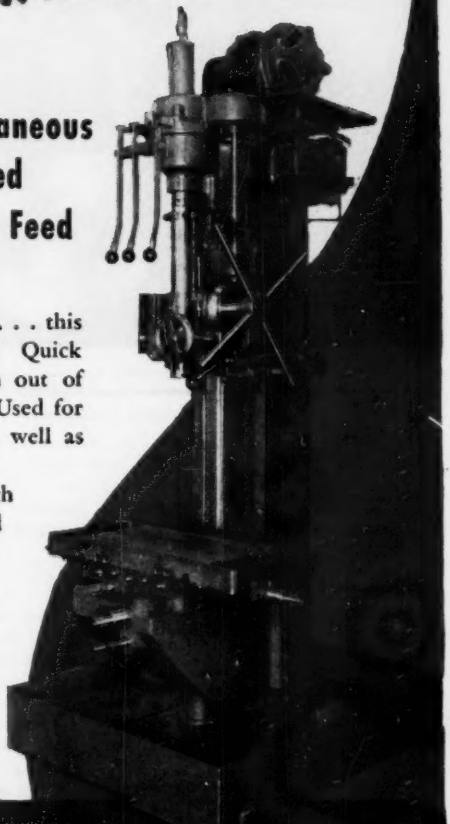


Fig. 12. Pantograph mechanism (50 to 1 fixed ratio) attached to special head on small vertical mill base assembly. Cutter was single point tool bit. Revolving work piece was mounted on centers attached to work table. Used to turn crushing rolls direct from drawing layout.

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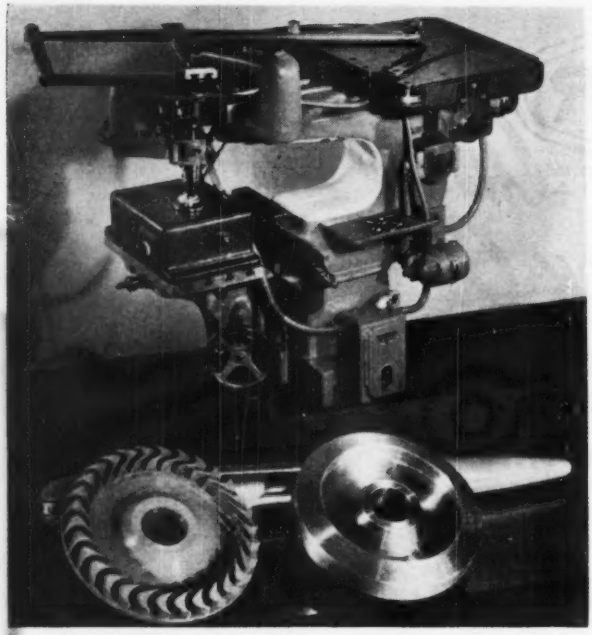
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Fig. 13. Standard 2-dimensional pantograph tooled for completely automatic operation. Work piece was small impeller. Profiling operation employed motor driven master; vertical cutter feed was cam operated. Holding fixture also indexed work piece electrically and stopped machine at end of cycle. Work piece was aluminum alloy; time per piece was 30 minutes.

• • •



"Don't deny it! I know you bought cotter pins from another company last month."

While the accuracy of this adaptation of pantography is not on the same level as that of others, it is sufficiently accurate for this particular operation.

MAP REPRODUCTION—While this article has been confined to a general discussion of the pantograph machine, it might be well to mention the fact that the origin of the machine stems from the simple pantograph drawing instrument familiar to all engineers and draftsmen. A development halfway in between the drawing instrument and the machine is a special purpose pantograph which is used to transfer contour lines from a flat map to actual relief contours on a relief map. This, too, is an interesting operation but would take too long to describe in this particular article.

Summary

It is easy to understand from the foregoing that the standard pantograph

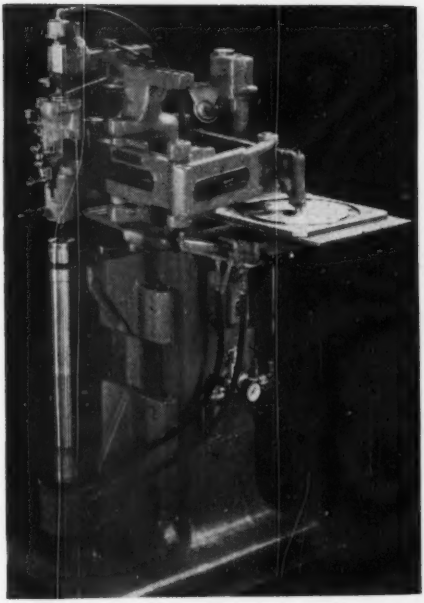


Fig. 14. Large 2-dimensional pantograph with special pnuematic holding fixture for profiling lugs at end of long tube. Manually operated with pnuematic vertical cutter feed. Note absence of conventional table, saddle and knee.

• • •

is one of the most versatile machine tools of our time and that it is susceptible to more successful special purpose and multi-purpose variations to meet specific requirements than perhaps any other mechanical device known to modern industry.

After 50 years of serving the broad field of manufacturing in a limited but expanding capacity, the pantograph today is just beginning to come into its own as a highly accurate machine tool which can be put to many uses to help increase America's productivity. THE END.

CAST THIS FOUNDRY QUIZ

By Herman Reichardt, Consulting Engineer

Count ten points for each question answered correctly. 0-20 is excellent; it means you know more about machine tools. 30-50 is still satisfactory. 60-80 . . . a jack of all trades? 80-100 . . . what are you doing in the machine tool business?

1. A riddle is an arm of a **jolting machine, tamper,** or **sieve.** _____
2. Rapping is **loosening arm of moulding machine, loosening pattern from mould,** or **packing sand.** _____
3. Ears are **handles on casting, handle on flask,** or **projecting piece in cope section.** _____
4. A bod is **something to hold core in place, ball of clay for closing tap hole,** or **arm for holding machine lever down.** _____
5. A charge is the **molten metal poured into the mould, pressure to operate moulding machine, or metal placed in furnace.** _____
6. Rammers are **drive arms of moulding machine, tool used for packing sand around pattern,** or **tapper for loosening pattern** _____
7. A dry sand mould is a **mould made of dry sand, mould made to hold shape permanently,** or **mould dried in oven.** _____
8. The cope is the **locking device upon the mould, the bottom part of the mould,** or the **upper part of the mould.** _____
9. A tap hole is **for vent in the mould, hole in which melted metal is poured into the mould,** or **opening from which moulten metal is drawn from furnace.** _____
10. Snap flasks are those which **snap into the other half, corrugated sides,** or **hinged corners.** _____

Answers to quiz on page 269.

An inexpensive indexing drill jig

By ROBERT MAWSON

Certain features are important in indexing jigs: the machining positions should be located positively. The tool should be fool-proof. The jig should be made to operate easily and quickly. One such fool-proof jig is described by the author.

Indexing jigs may be designed in two types, one type of indexing rotates the workpiece-holding-portion to the machining positions; with the other type the piece is held stationary and the member holding the guide bushings is rotated to the machining positions.

Certain features are important in indexing jigs: the machining positions should be located positively. The tool should be fool-proof. The jig should be made to be operated easily and quickly.

Figure 1 is a Disc Segment made from a bronze casting. The first machining operation on this detail is to hold it in a chuck or face plate on a lathe and drill and ream the ¾ inch hole in the boss. The workpiece is then placed on an arbor and the outside periphery, both sides and the projecting boss machined. A key-way is then made through the boss. These machined castings are then converted into either Style **A** or Style **B** by drilling and then reaming two 5/16 inch holes in the positions shown on the illustration.

The drill jig, figure 2, used to machine these holes is made with a cast iron base **A** machined on the surfaces **f**. The jig base is provided with a vertical wall **B** which is machined on its rear face to be at right angles with the four machined base projections. A machine steel locating plate **C** is provided with a boss **D** to be a good running fit in a machined hole in the vertical wall **B**. In the locating plate **C** and boss **D** is drilled and reamed a hole for a shouldered stud **E**.

In the stud is fitted a 5/16 inch key which is made to be a good sliding fit in the keyway of the Disc Segments and also a keyway which has been machined in the locating plate **C**. On the forward portion of the stud, which is threaded, is placed a special shouldered nut provided with two extending pins to provide a convenient medium for moving the nut on or off the stud. On the upper machined surface of the jig vertical wall is fastened with two fillister head screws a machine steel bushing plate **F**. In this plate is accurately located a tool steel liner bushing and a tool steel slip bushing **G** of the proper size to guide the drill which is used before the reaming of the holes.

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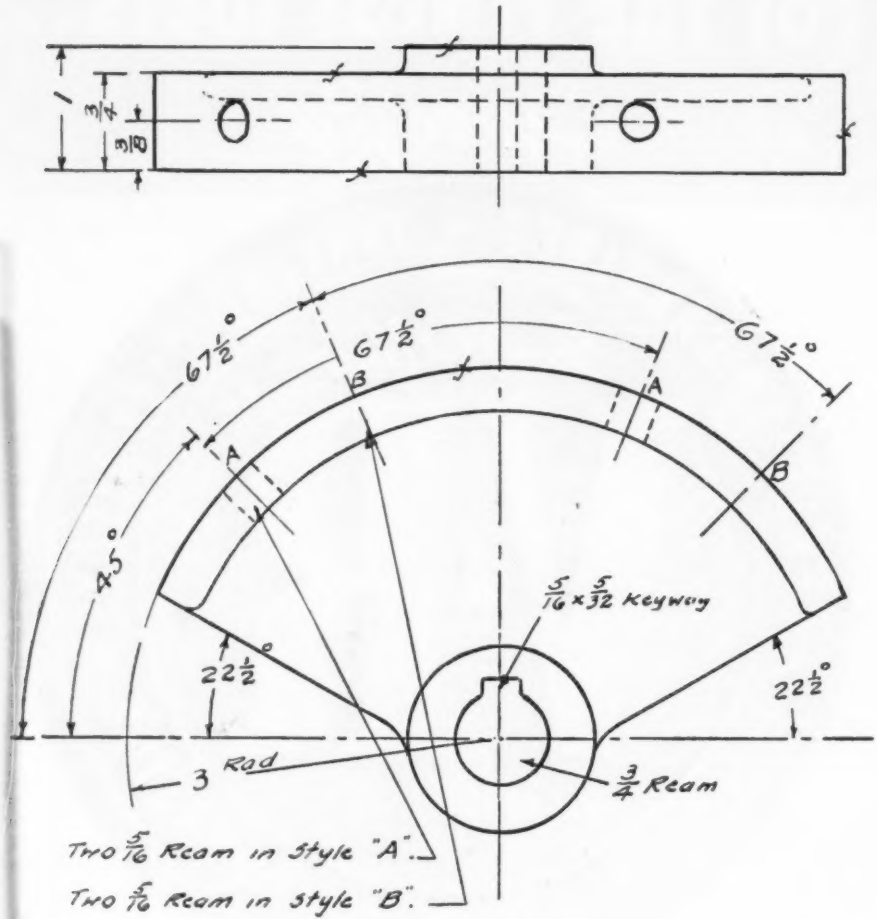


Fig. 1.

tical wall is fastened with two flat headed screws a machine steel index pointer **H**. It will be noticed that the pointer of this detail extends well over the edge of the locating plate. On the periphery of the locating plate are made indentations in the correct locations for the holes to be machined in Style **A** and Style **B** Disc Segments.

In the vertical wall is machined a hole in alignment with the guide bushing **G**. In this hole is then placed a tool steel bushing **J**. In the locating plate **C** are machined four holes to suit the locations of the holes to be machined on the Disc Segments. These holes are also on the same arc, from the stud center of the jig, as the bushing **J**. In these machined holes are then placed tool steel bushings **K**. A machine steel,

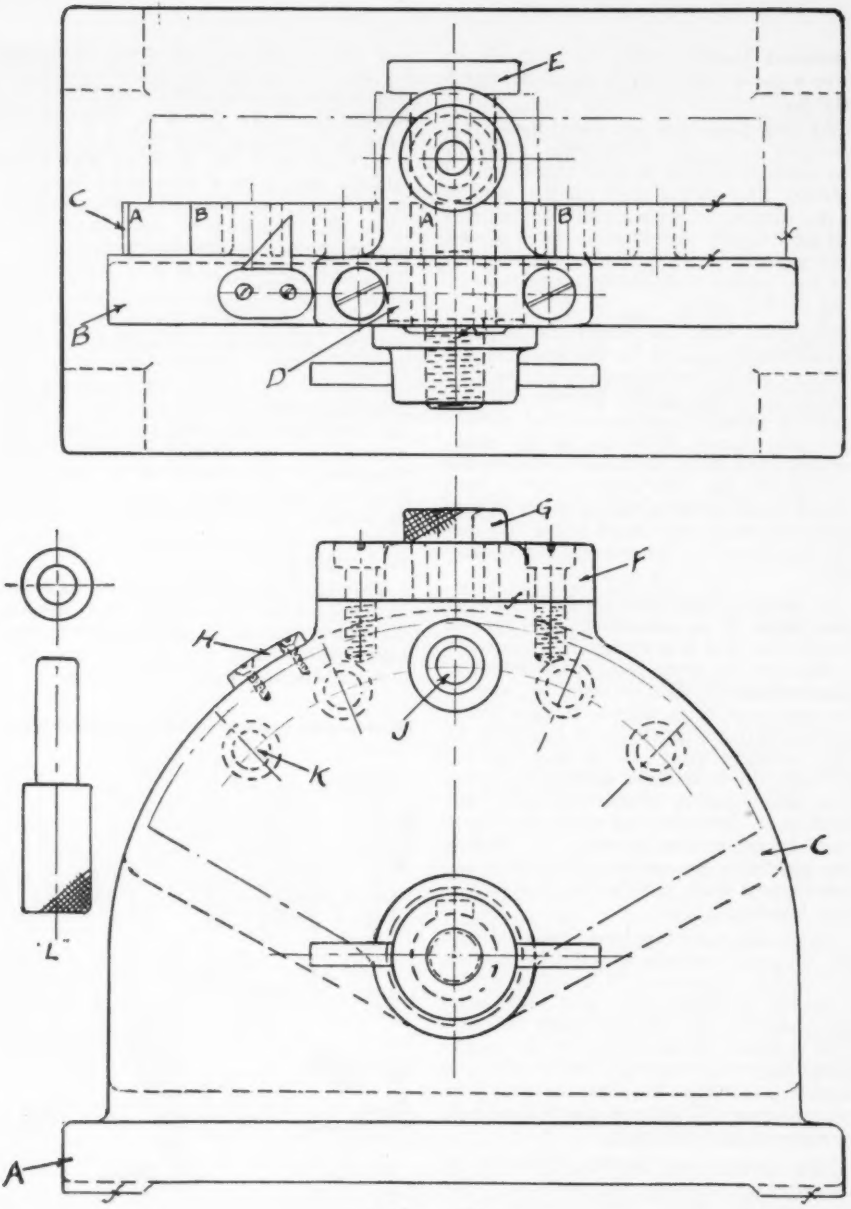


Fig. 2.

hardened locating plug **L** is made to have a good sliding fit in the bushings **J** and **K**.

To use the drill jig the jig is first clamped onto the drill press table in the proper laction to suit the machine spindle. The special nut on the stud **E** is then removed which can then be slid out of the jig. The stud is now placed into a Disc Segment being located by the key in the stud fitting into the keyway in the piece.

The stud, with the workpiece in position, is next placed in the hole in the locating plate being located by the key in the stud fitting the keyway in the locating plate. These assembled details are now placed into the jig by placing the boss **D** in the hole in the vertiwall of the jig. The special nut is then placed on the threaded porition of the stud and when tightened holds the details in place for the machining operation.

To position the drill jig for locations take style **A** as example. The special nut on the stud **E** is turned back enough to remove the pressure on the locating plate which is then rotated to one of the positions **A** as shown by the index pointer and the marking on the plate **C**. The locating plug **L** is then placed through the bushing **J** and the bushing **K** in the locating plate. It will be noticed that the indexing method is only used to assist the operator in finding the positions the positive locations are determined with the bushings **J** and **K** and locating plug.

When the plug has been inserted into the proper bushings the special nut on the stud is tightened. This action draws back the holding plate and Disc Segment and holds them securely in position. A hole is then drilled in the workpiece the drill being guided in the slip bushing **G**. The bushing is then removed from the jig and the drilled hole is reamed to 5/16 inch.

The special nut is then released on the stud to remove the pressure from the locating plate. The locating plug is also removed from the bushings where it was placed for the first setting. The next position for the style **A** workpiece is then determined by rotating the locating plate and workpiece to the next position as shown by the index pointer registering on the **A** indentation on the plate **C**. The locating plug **L** is again placed in the bushing **J** and bushing in the locating plate. The special nut is now tightened onto the stud which draws back the locating plate and workpiece and the drilling and reaming operations are repeated.

To remove the finish machined workpiece it is only necessary to remove the special nut from the stud and slide out the locating plug. The locating plate with the Disc Segment are then sild out of the jig. The locating plate and Disc Segment are then removed from the stud and the drill jig is ready for assembling to machine another Disc Segment. If style **B** is to be made the locating plate with the workpiece would be rotated until the index pointer coincided with positions **B** on the locating plate.

This drill jig is inexpensive to build, it can be operated easily and quickly, the workpiece is located positively and held rigidly and machines parts at a low production cost. THE END.

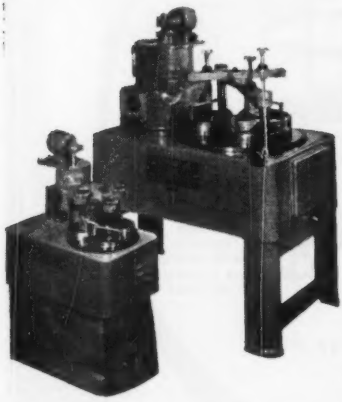


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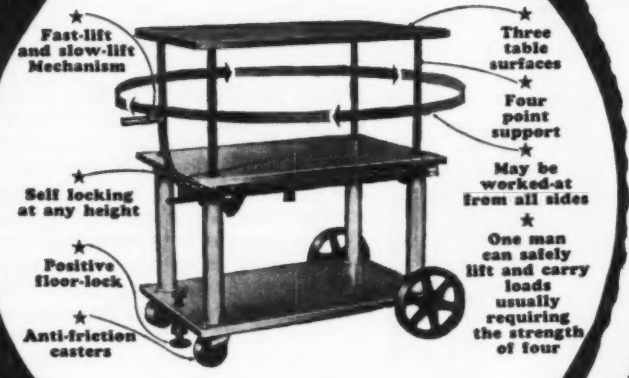
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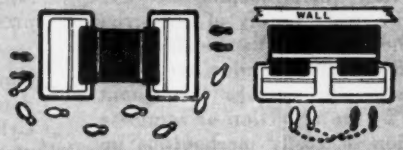
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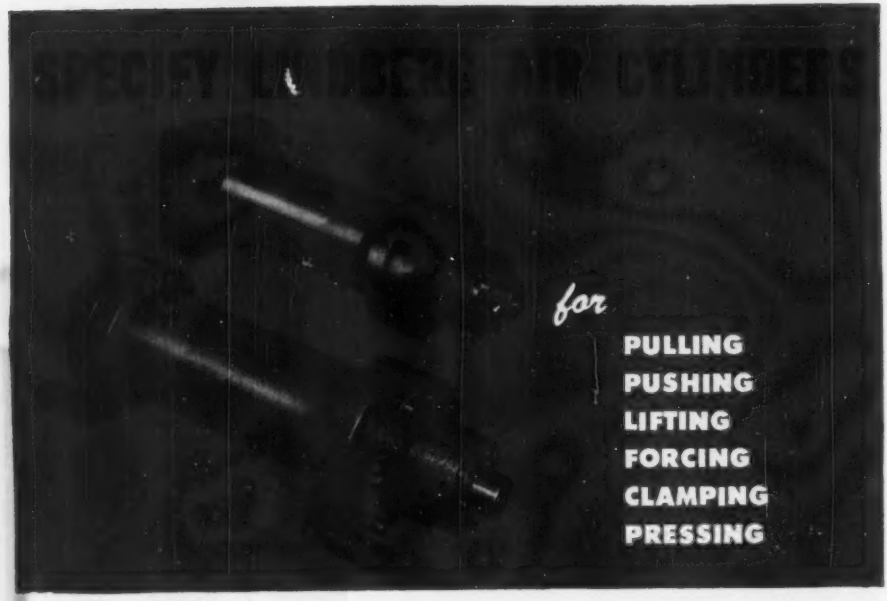
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in the screw machine spindle, as fast as the preceding one was used up. The roller feed mechanism operated in connection, to feed any required length with a single action. It consisted of a lower roller, which supported the under side of the rod at the proper height, and an upper feed roller, just above the lower one mentioned, to provide a pair. The upper feed roller, while continually revolving, is normally out of contact with the rod so long as the machine collet is closed, and the machine in operation. A timing mechanism operates in conjunction, so that, as the collet opens, the top feed roller is forced down against the rod, automatically feeding it forward against the stop.

Another and more recently developed screw machine feed is pneumatic in its operation, and will also feed rapidly and accurately to any required distance. The feed in this case is really a long air cylinder, which will contain a full length stock bar. It also contains a piston, with a ball bearing cup center at the forward end. This cup center has the shape of a female cone. It therefore automatically centers and supports the rear end of a rod of any diameter. Air is supplied to the cylinder at low pressure. Thus, there is always a forward-pushing effect against the rod. As soon as the collet opens, consequently, the material is instantly moved forward, against the stop.



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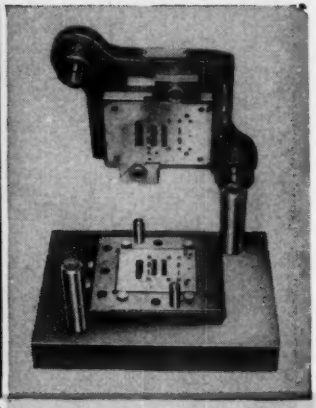
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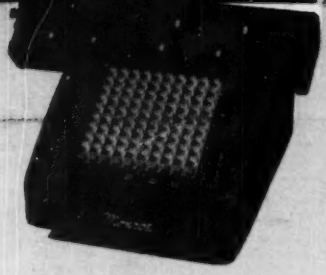
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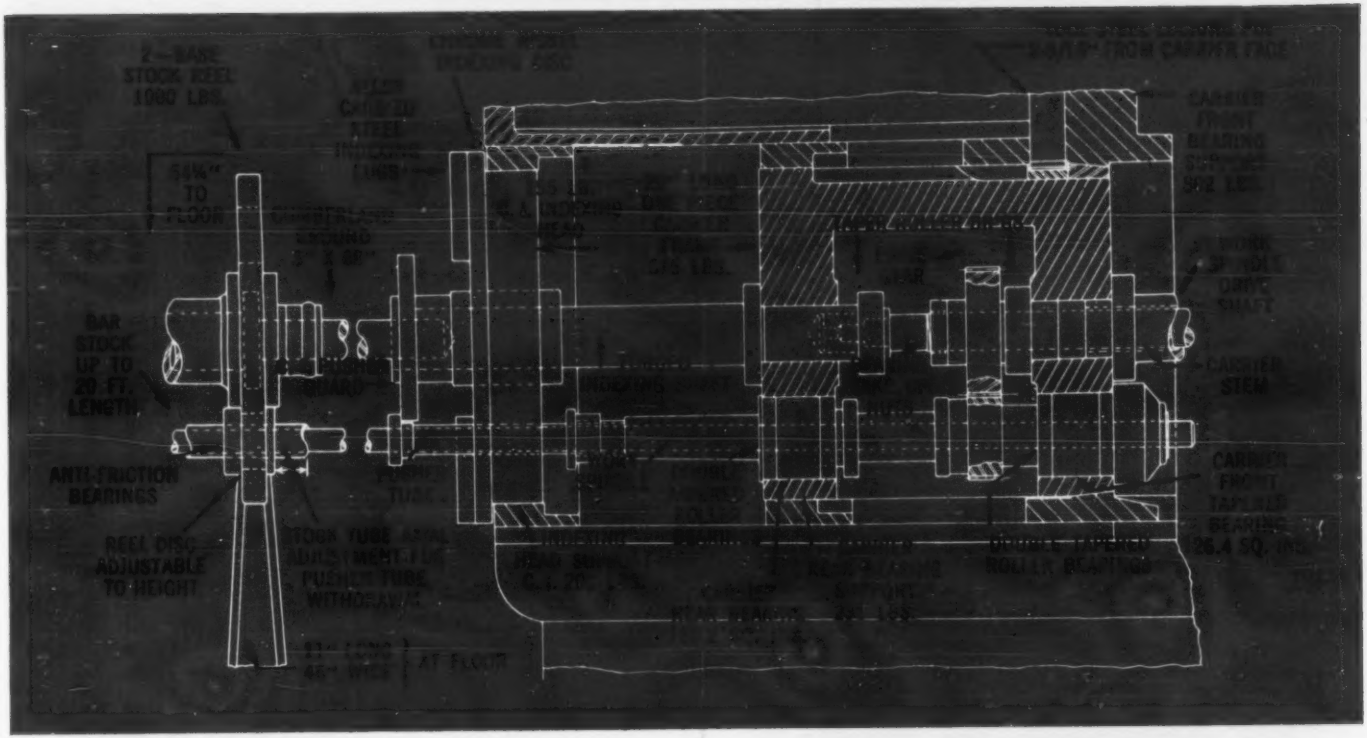
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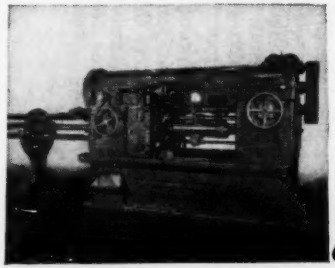
The thick, heavy ribs resist strain. The tapered front bearing and the spindle drive gears are within 3" and 9¼", respectively, of the collet faces. The wider spaced bearings give better alignment and load distribution. The Carrier is free of Cross Slide positive stop pressure.

2. **The entire INDEXING MECHANISM is supported by the Top Bed as well as the Base. There are fewer wearing parts.**

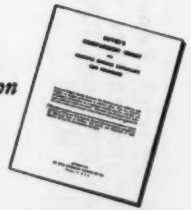
The Indexing Head takes the brunt of the indexing load. It is supported by the short frame member midway between the Carrier and the Stock Reel. It is joined to the latter by strong center shafts.

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REPORT NUMBER **7**

Automatic Screw Machines

This is the seventh in a monthly series of special reports discussing various types of machine tools. Included in this month's report on Automatic Screw Machines are:

1. planned tooling increases production
2. cost estimating on screw machine products
3. use of carbides on screw machine operations
4. descriptions of late model single and multi-spindle machines
5. specifications of American-built machines

The six previously published reports discussed: 1.Thread Rolling. 2. Power Press Brakes, 3,4,5, Milling Machines. 6. Honing, Lapping and Superfinishing. Reprints of any one of these reports are available at no charge.

Part 1. Increase Screw Machine Production with Planned Tooling

by William F. Schleicher, Editor

Material, drawings and photos through courtesy of Greenlee Bros. & Co., Rockford, Illinois

Correlation of Tooling

The wide variety of operations occuring simultaneously on automatic screw machines present some problems for screw machine personnel whose duties involved planning and setting up jobs on these machines. Obviously, each operation must fall within the range of the machine, but the wide latitude of tooling possibilities aids in selecting a well balanced tooling arrangement.

The best machining time obtainable on any particular job is the time repossible to reduce the longest operation. In many existing set-ups it is possible to reduce the longest operation by planning, by adding special attachments where they are applicable, by dividing the longest operation over additional work stations, or by a closer correlation of the tooling arrangement finally selected as the most practical.

The latter method is sometimes overlooked. Close examination of figure 1, will show the successive steps in machining retainers at 360 pieces per hour. Note how closely the tool travel is divided among the various operations. Idle travel is reduced to a minimum, and no one tool is called upon to remove an excessive amount of material. Required tool travel and cam travel are given to show the close correlation.

Figure 2 shows the six positions and

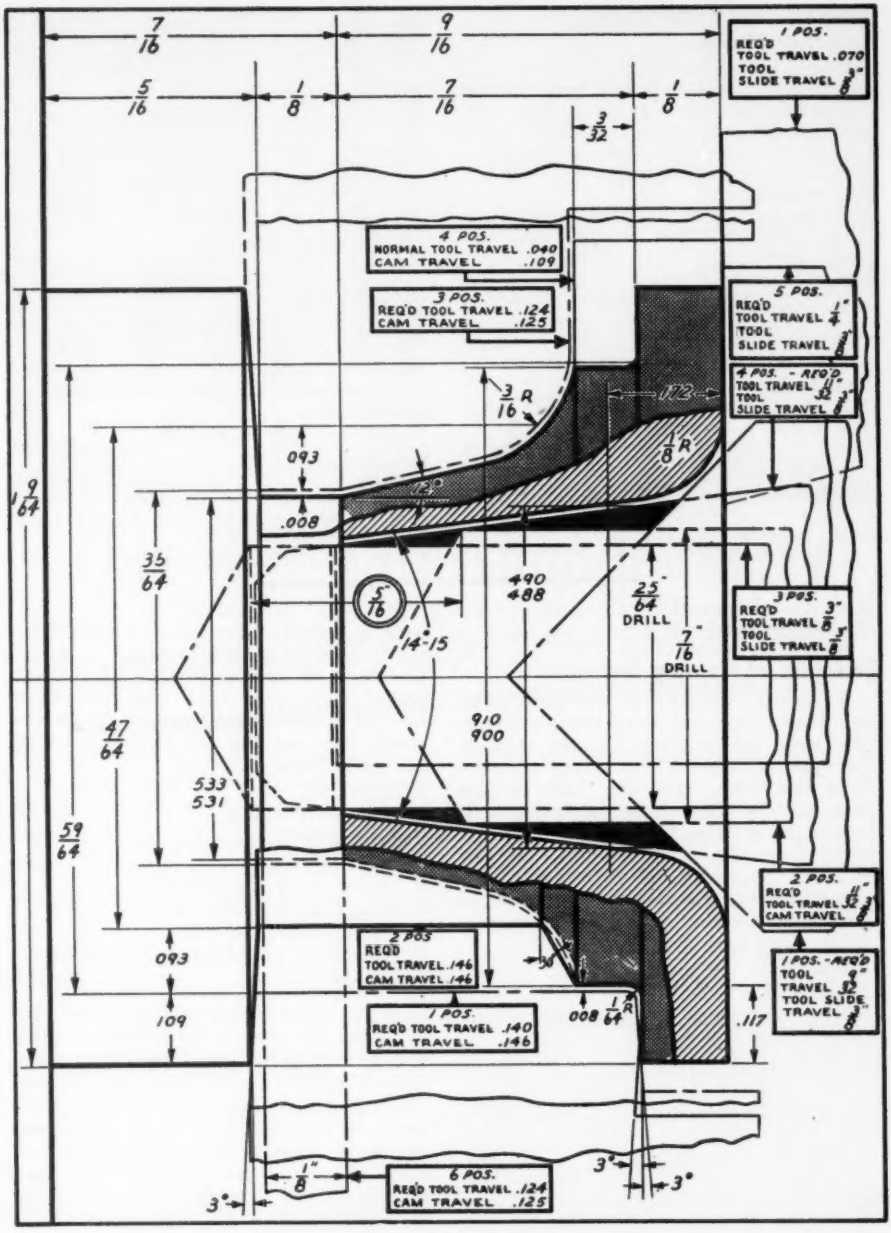


Fig. 1. Successive steps in machining retainers.

Job Data on Machining Retainer Rings

Machine: 1⅜" 6-spindle machine equipped with cam-feed tool slide and fast indexing mechanism. Material used is type 416 stainless steel machined at .0054" feed. Machine time is 10 seconds per piece, or 360 per hour gross. Tool slide stroke is ⅜".

First Position

Spot drill and chamfer—.0054" feed, 84 sfm
Rough face end—.0054" feed, 151 sfm
Rough form—.0021" feed, 151 sfm

Second Position

Drill for taper part way—.0029" feed, 106 sfm
Rough form—17/32" dia. and finish form .910" dia., .0021" feed, 122 sfm

Third Position

Drill remainder for tapper—.0029" feed, 94 sfm
Rough form—17/32" dia. and 3/16" radius —.0018" feed, 120 sfm

Fourth Position

Rough taper drill—.0054" feed, 68 sfm
Finish form—17/32" dia. and 3/16" radius —.0016" feed, 120 sfm

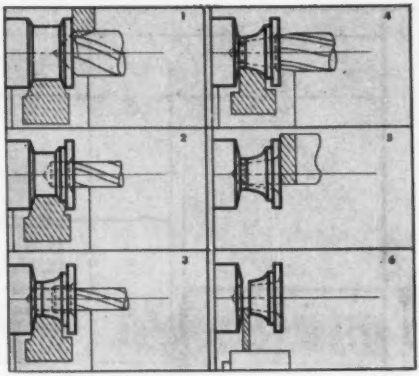


Fig. 2. Sequence of operations in machining retainers.

• • •

Fifth Position

Finish counterbore 14°-15' taper, ⅛" radius, and finish-face end—.0054" feed, 151 sfm

Sixth Position

Cut-off—.0018" feed, 71 sfm

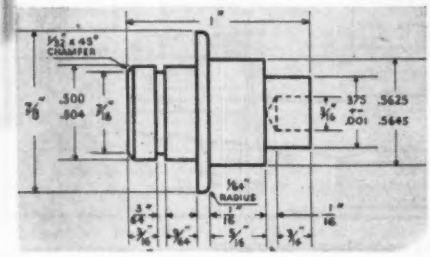
sequence of operations involved in machining retainer rings.

Selection of Tooling Sequence

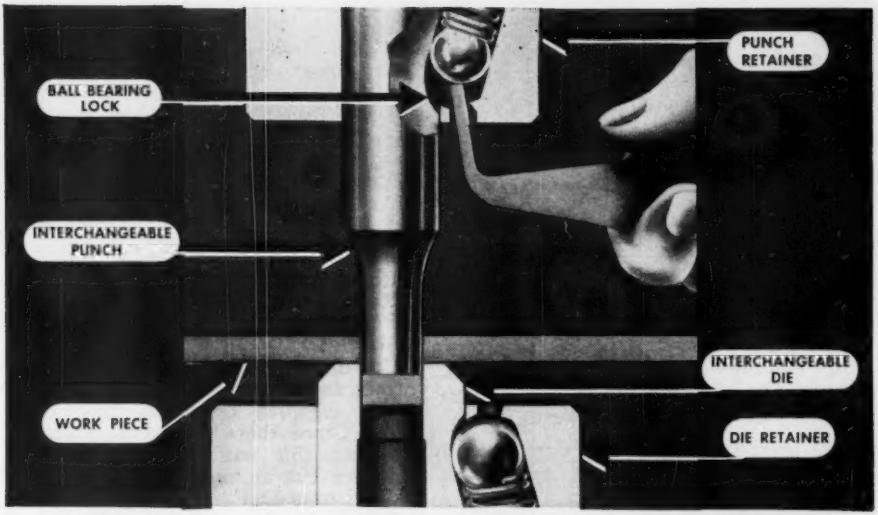
A careful scrutiny of the part print will disclose several requirements which are basic information for any set-up: the type of material necessary to produce the part, and the size of the stock and its basic shape, i.e. hexagonal, round or square. Other details to be noted from the print include the type of finish required, the degree of tolerances allowed, and any special machining operations that may be necessary to produce the final results. With these factors in mind, make a tentative list on the tool slide and cross slide operations that are obviously needed to machine the piece. As an example, the tooling for figure 3 would be as follows:

1. Spot drill
2. Drill 3/16" hole
3. Turn .5625" dia.
4. Turn .375" dia.
5. Shave both diameters
6. Rough form .500" dia.
7. Finish form .500" dia.
8. Face O.D. and form 1/64" radius
9. Cut-off

Fig. 3.



After listing the operations required to finish the piece, divide them among the 6 cross slides and 6 tool slide positions available. Since both the .375 and .5625 diameters require a shaving operation to maintain the close tolerances required, these can both be completed with the same shave tool. This same tool can also face the O.D. and form the 1/64" radius. The sequence would then be listed as follows:



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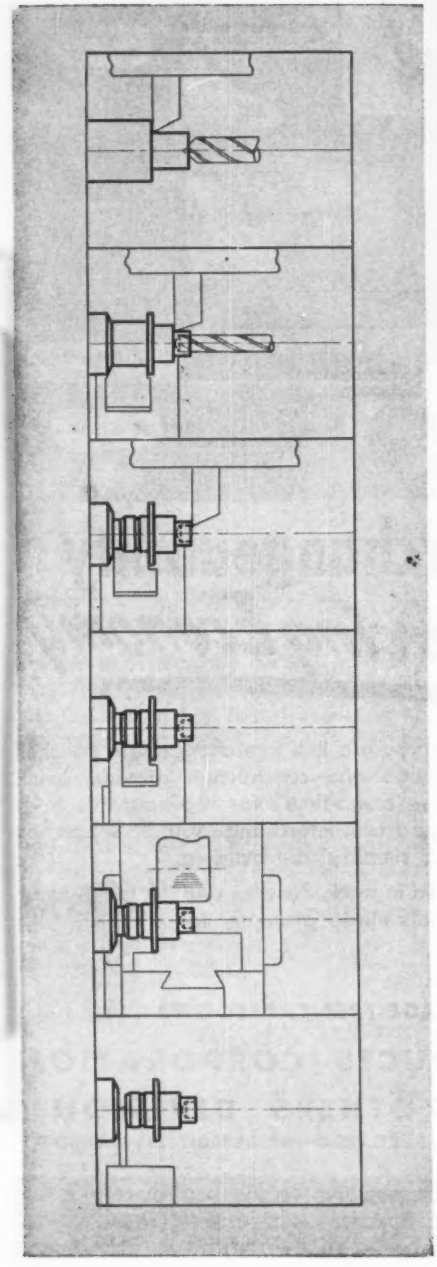


Fig. 4.

Tool Slides
1. Spot drill—rough turn .5625" dia.
2. Drill—Rough turn .375" dia.
3. Face
4. .....
5. .....
6. .....

Cross Slides
1. .....
2. Rough form
3. Rough form
4. Finish form
5. Shave
6. Cut-off

Note, from figure 4, that an additional rough forming operation has been added. Since there are extra positions available, this was done to avoid an excessive cut on the one rough forming tool used and serves to prolong the tool life over the set-up.

Planning the Tooling Sequence

When planning a sequence of operations several important points must be borne in mind:

Use as Many Tooling Positions as Possible. Dividing long operations and spreading them over several work stations has several advantages. In many cases it permits the use of a smaller tool slide stroke with a resulting increase in the rate of production. Then, too, there is an advantage in a better balance of tooling so that no one tool is subjected to an extremely heavy cut which will necessitate frequent downtime for resharpening.

Use Multiple Tooling Arrangements where possible. When machining parts which require a relatively simple tooling set-up to complete, it is often feasible to machine several pieces at a time, feeding out sufficient stock to accommodate two or more pieces, which may then be cut off in several sections. Where job runs are unusually large automatics may be arranged for feeding out stock in a number of positions. Figure 5 illustrates an example of this.

The tooling layout in figure 5 shows a method of machining small gear blanks at 800 pieces per hour gross.

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Fig. 5. Tooling layout shows method of machining small gear blanks two at a time.

• • •

Note that a section of stock long enough for two pieces is fed out, with the first completed piece severed in 4th position and the second in 6th position. The stock is SAE 1113 steel.

Combine Tooling to Increase Machine Facilities. Occasionally a part is encountered which should be completely machined on the automatic but is not, because of a lack of tooling stations. Often the efficient grouping of multiple tools in each position can overcome the shortage of work stations.

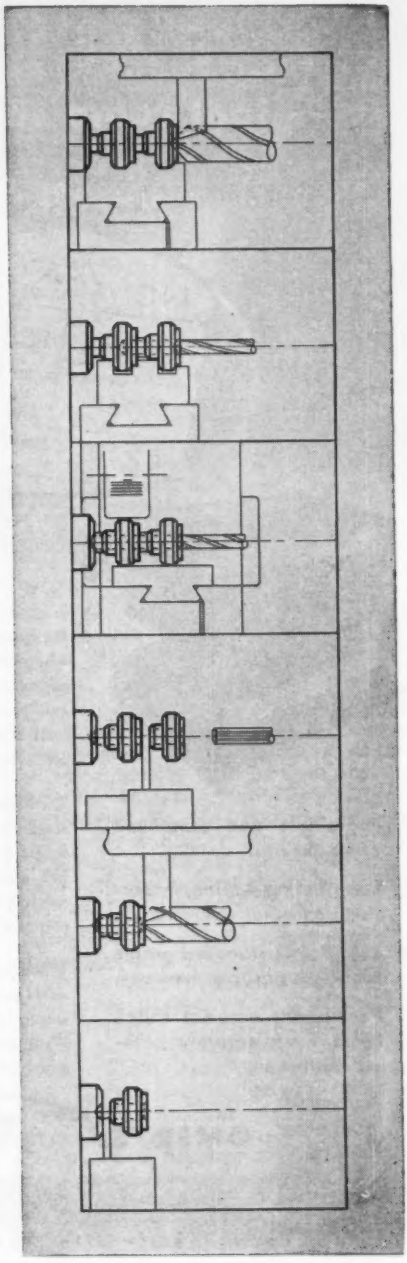
Special Attachments Increase Production

In numerous cases the production rate on screw machine jobs can be profitably increased with the application of various attachments. High-speed drilling, form turning, and other attachments allow a better selection of feeds and speeds for the over-all job set-up.

An End-Working Attachment. End-working attachments, properly applied will greatly increase the versatility of the machine. This tooling includes a wide variety of operations such as drilling, threading, tapping, reaming, turning, etc. To cut down the machining time on many jobs, particularly when cross-slide positions are already loaded with forming, knurling, or shaving tools, substitute tools or combinations of end-working tools may be used in the same positions.

Figures 6, 7, and 8 illustrate three of the most commonly used end-working attachments, a roller rest turner (6), a knee turner (7), a chamfering tool and holder (8).

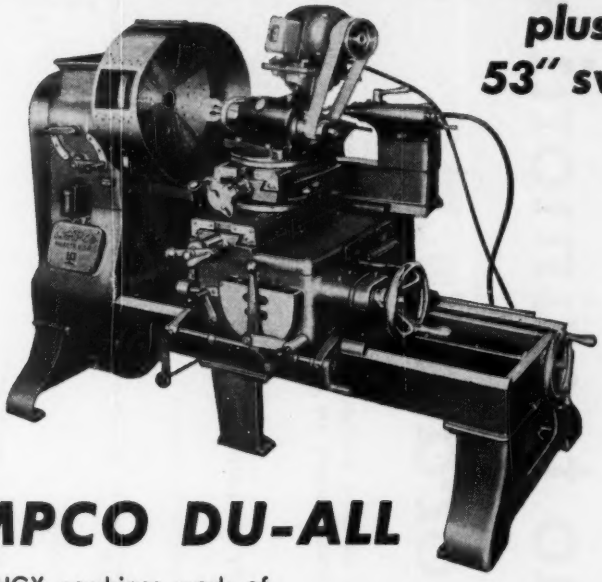
The roller rest turner has certain advantages over the knee turner because it can be used where close tolerances are required, and also it gives the necessary support needed on long, slender work. It can be used in any spindle position, either alone or in conjunction with other tools. Figure 6 shows a roller turner which is being used with an auxiliary knee turner, the roller turner turning the large diam-



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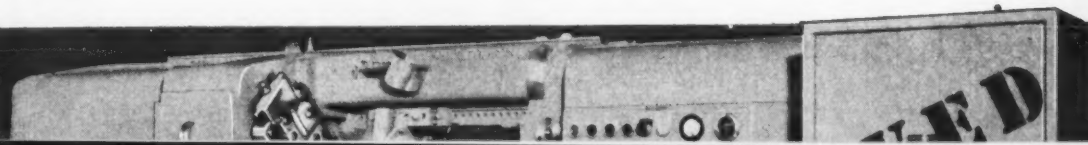
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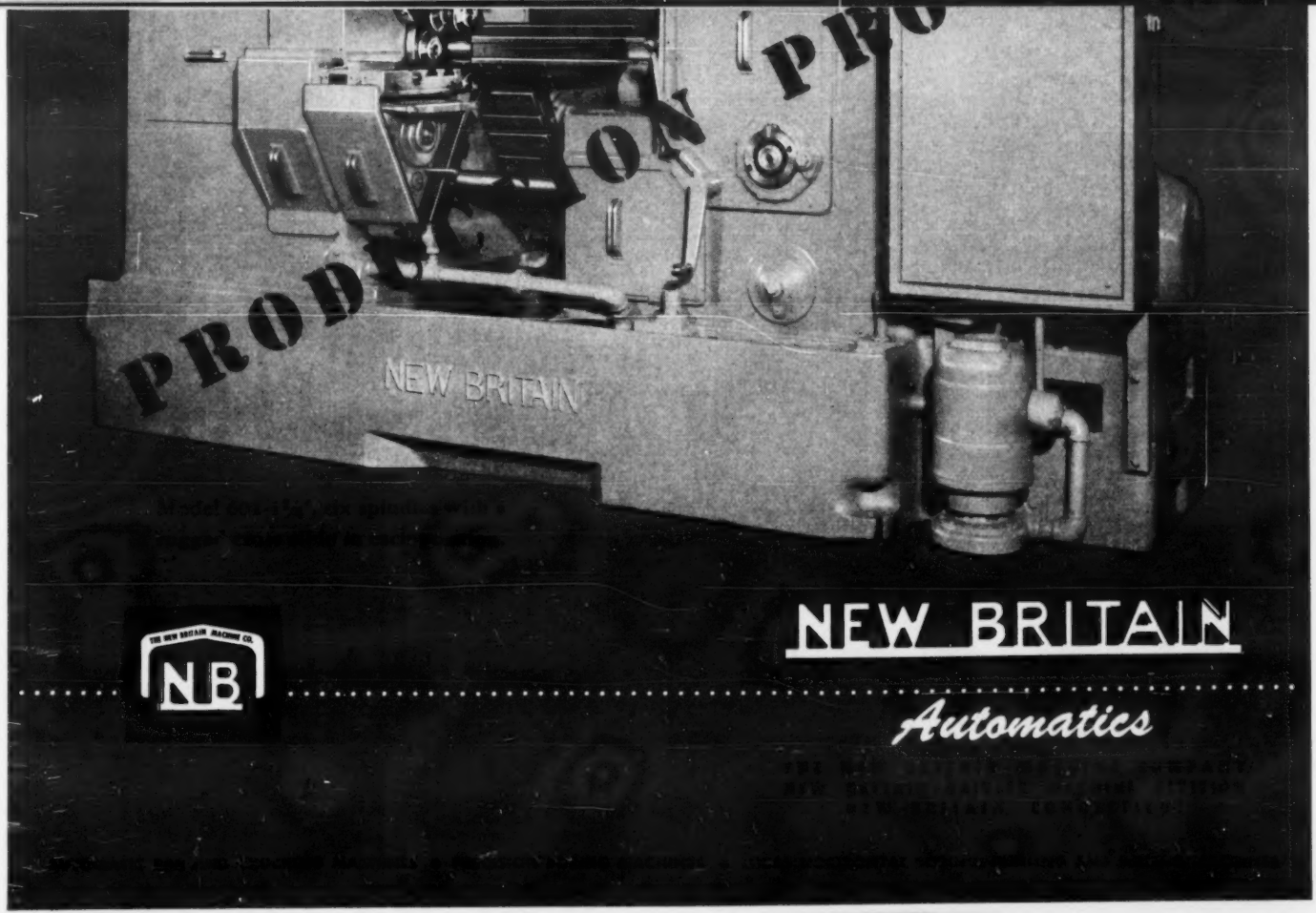
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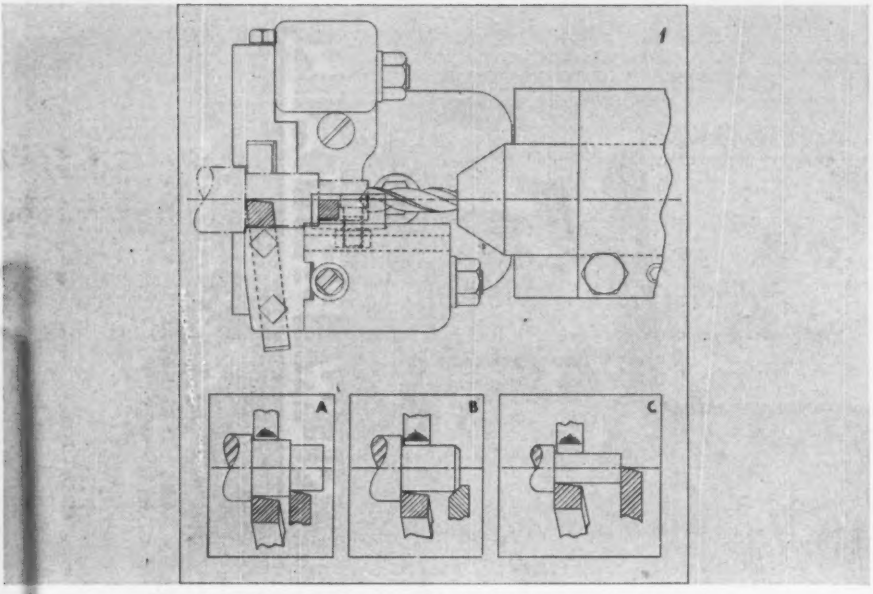


Fig. 6. Roller rest turner and its various applications for screw machine operations.

• • •

eter well up on the piece and the knee turner turning the small diameter on the end of the piece. Note that a drilling operation is also possible in this position, making three operations not including the cross-slide operation. The small drawings illustrate several other tooling combinations which are possible with these attachments: turning two concentric diameters (A), turning and chamfering (B), turning and facing (C).

Figure 7 illustrates a knee turner, an attachment usuable in all positions on the main tool slide for removing stock in roughing, for accomplishing certain special operations such as the undercutting operation illustrated in (D), for chamfering either the outside edges (E), or the edges of drilled or reamed holes, or for facing ends and shoulders (F). A particularly useful advantage of the knee turner is that it permits forming operations to be accomplished in the same spindle position in set-ups similar to the one illustrated in the drawing, where a forming and a turning operation are being made on the work.

Figure 8 shows a chamfering tool and holder being used in conjunction with a drilling operation. It may also be used for facing, and is extremely handy where tool slide space is limited. The type shown has the clamping foot forward, but a similar attachment with the clamping foot at the back is also available.

Threading Attachment in Use. Machined from 2-inch SAE X1112 stock, only 19 seconds were required to complete the total of 12 individual operations necessary to produce the part illustrated in figure 9. Part was machined entirely with high-speed tools, plus a standard threading attachment.

The operational sequence is shown in figure 10.

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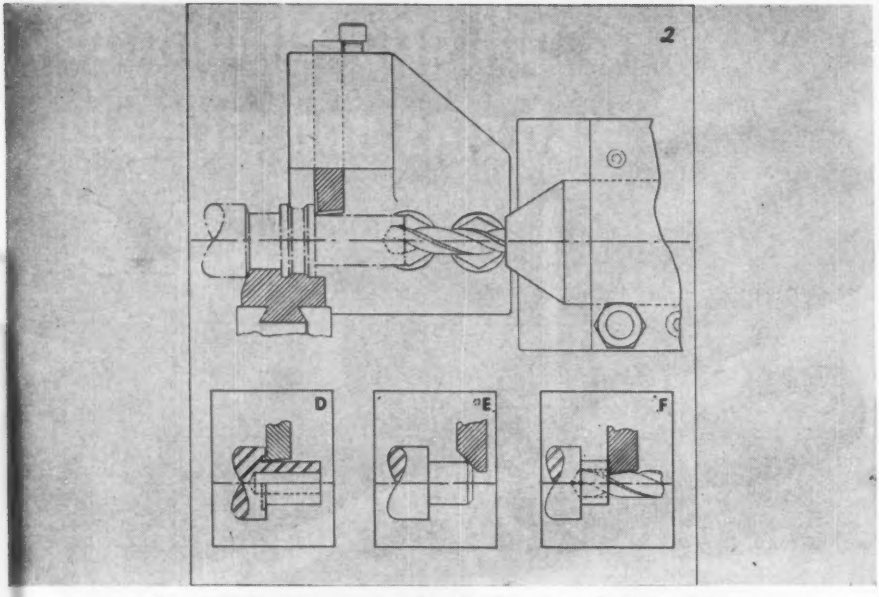


Fig. 7. A knee turner attachment. Drawings D, E, F, illustrate possible tooling arrangements.

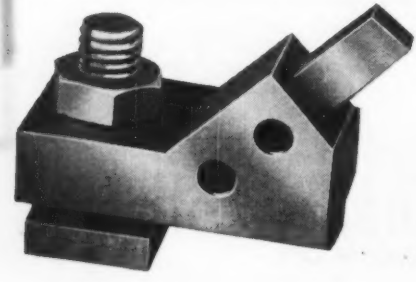
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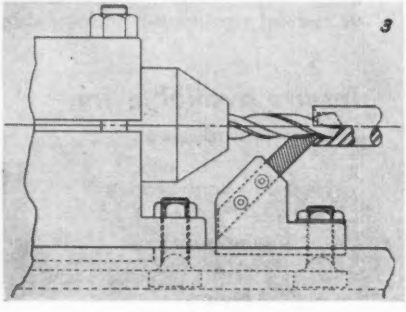
saved on the machine time required to produce parts like the one shown in figure 11 can mean the difference between showing a profit or a loss on the total job run. The advantages of using special attachments where they are applicable cannot be over-emphasized, particularly when these attachments can be used for a large number of the ordinary screw machine set-ups encountered in the average shop.

The tooling layout shown in figure 12 at the right utilizes a cam-feed, fast-index automatic equipped with two high-speed drilling attachments, and producing 257 pinion gear blanks per hour from 1½ inch round B1112 steel. Note how effectively each tooling condi-

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Fig. 8. Drawing and photo of a chamferingtool and holder.





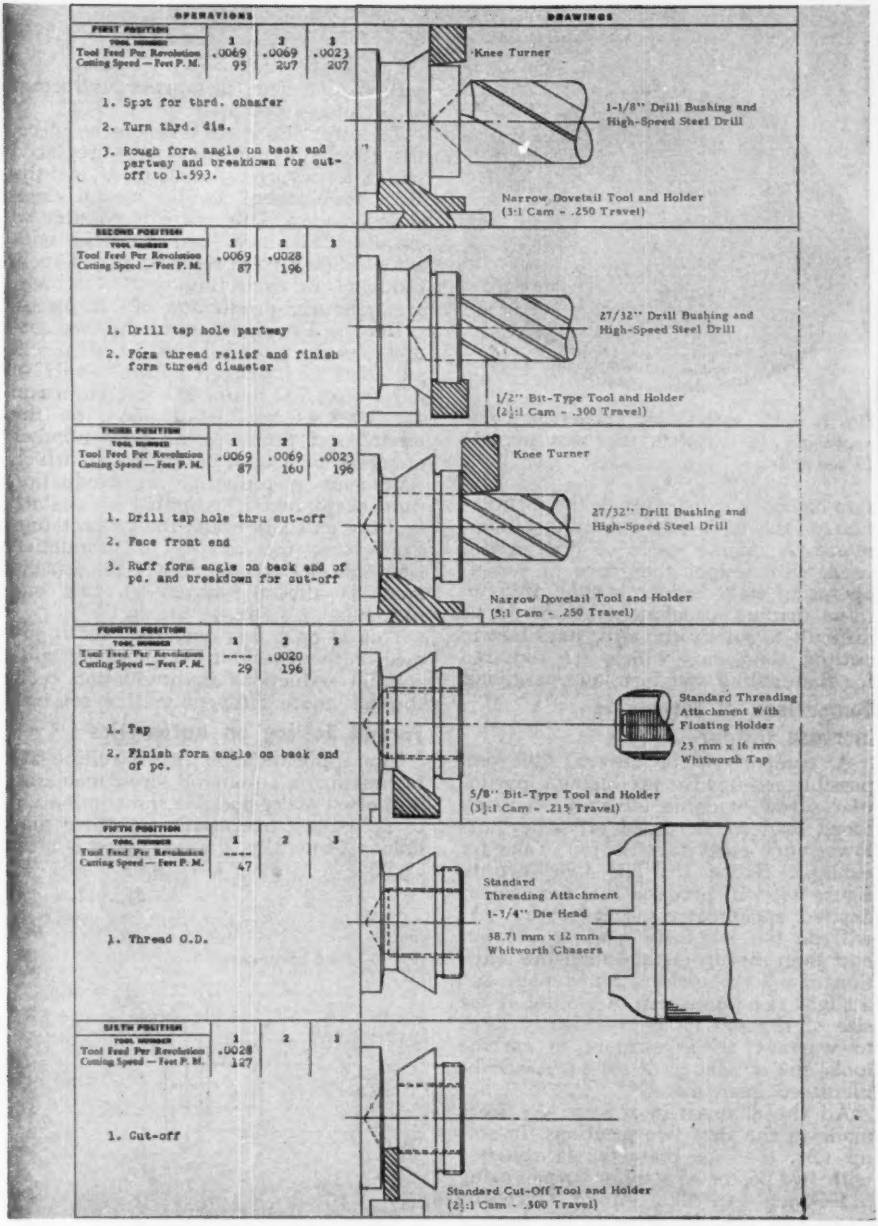


Fig. 10. Operational sequence to produce the part shown in figure 9.

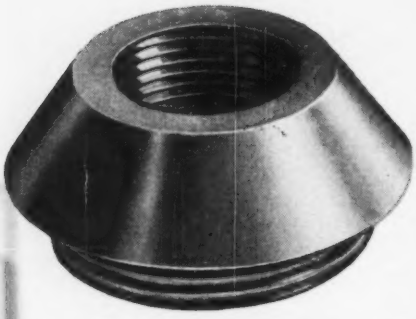


Fig. 9. 12 individual operations were necessary to complete this part in only 19 seconds.

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tion has been satisfied with the installation of the high-speed drilling attachments. A spindle speed of 415 r.p.m. is used, with a tool slide feed of 0.0074" operating on a ⅝ inch stroke. Without these drilling attachments it would be difficult to satisfy the wide variation in cutting conditions which are required for the drilling and forming operations.

Comparison of Set-ups to Increase Output

A comparison of several different possible set-ups for producing a particular screw machine job may, in many cases, lead to increased efficiency and lower unit costs for the job. Take for example figure 13. The two layouts, figure 14, will produce this part to the desired specifications, yet set-up (A) will do the job faster and at a lower cost than set-up (B) through the addition of a form turning attachment and a slight rearrangement of tooling. If the size of the job lot is sufficiently large to warrant an investment in carbide tools, the efficiency of set-up A can be increased even more.

All the changes in set-up (A) were made in the first two positions. In set-up (B), the .950 diameter is roughed with two passes of a roller turner using a 1⅜-inch tool slide stroke, since the cutting of this diameter is the longest operation in the sequence. The 1⅜-inch stroke permits a cycle time of 33½ seconds per piece, or a gross production of 107 pieces per hour.

To lower the cycle time on the piece, the two roller turners were replaced with a form turning attachment, and the form tool moved to the second cross slide position. This made it possible to cut the 2.808-inch long diameter with a tool slide stroke reduced to 1⅛-inch, reducing the cycle time to 27½ seconds, or an hourly production of 131 pieces.

Here is a comparison of the two set-ups over the total job run. At 107 pieces per hour as produced with set-up (B), it requires 234 hours to complete a run of 25,000 pieces. Set-up (A), on the other hand, produces the same number of pieces in a total of 191 hours, which represents a reduction in production time of 43 hours, assuming a constant tool life exists between the two set-ups. Converting this saving in production time into dollars, the cost of the attachment is almost realized on this one particular job run.

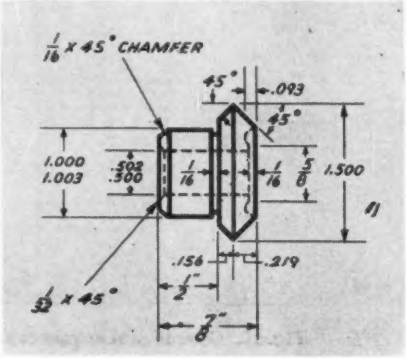
This is only one example, but it indicates the possibility of making substantial reductions in production costs through more efficient tooling set-ups.

Thread Rolling on Automatics

The application of thread rolling attachments on automatic screw machines will often make possible the elimination of secondary operations on other machines. Generally, thread rolling is most

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Fig. 11.



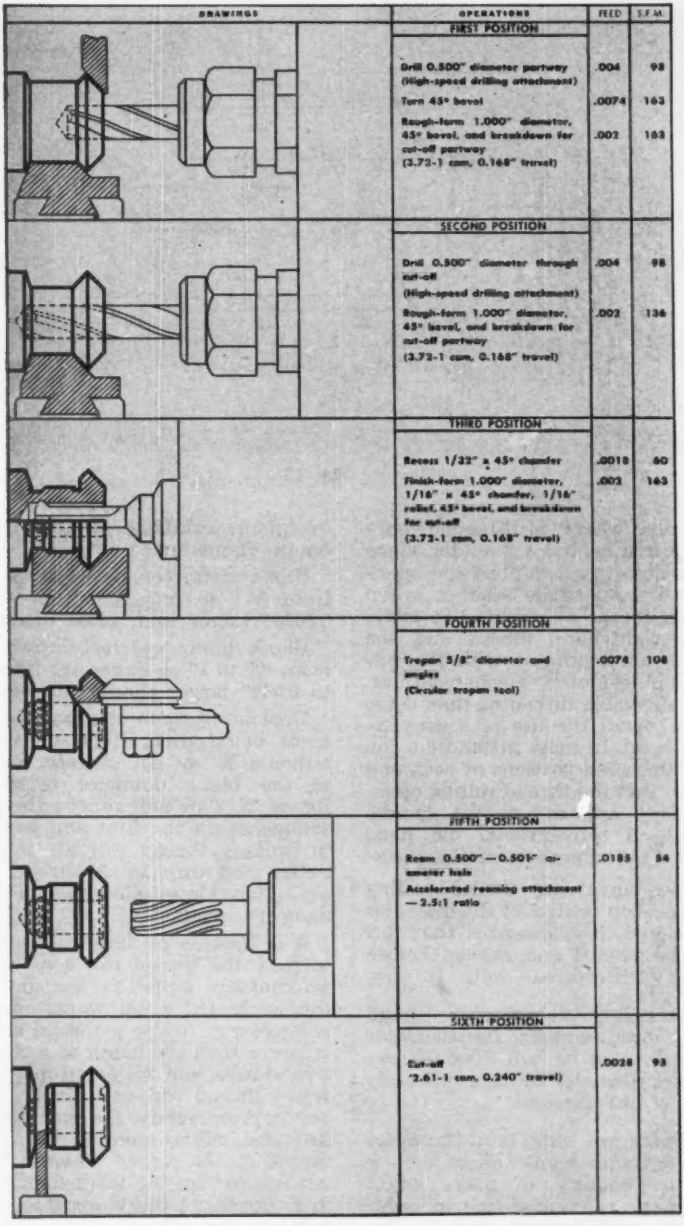


Fig. 12. Operational sequence to produce the part shown in figure 11.

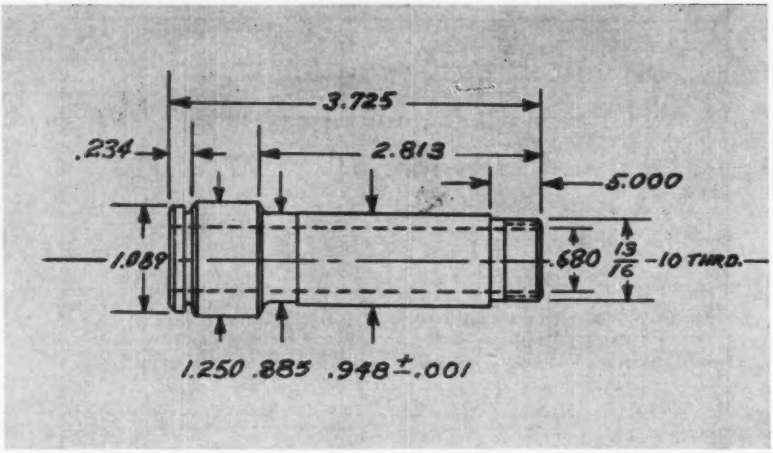


Fig. 13.

advantageous where a threaded portion is required behind a shoulder, since it is impossible to accomplish the operation with a standard die head; or, when a left-hand thread is required in addition to a right-hand thread and the machine is not equipped with the necessary double-clutch mechanism; or, when the allowable threading time is too limited to permit the use of a conventional die head. In most instances a job requiring threaded portions at each end is set up so that the thread rolling operation is done adjacent to the spindle nose, while a conventional die head threads the outer portion of the piece.

Operations involving thread rolling require precision control of the diameter to be threaded. It is essential that this diameter be turned and shaved before application of the thread rolls.

Since metal is displaced by the thread rolls in forming threads, the diameter of the blank must be less than the required screw diameter by approximately the depth of one thread.

While there are rules and formulas which determine blank diameters, it is often necessary to make slight changes in the calculated size in order to secure a well-formed thread. The following information may be found useful in establishing trial sizes for blank diameters:

Blank diameters for screws varying from ¼" to ½" are from 0.002" to 0.0025" larger than pitch diameters.

Blank diameters for screws ranging from ½" to 1" or larger are from 0.0025" to 0.003" larger than pitch diameters.

Depending upon the type of attachment being used, it is suggested that either a 30° or 45° chamfer be applied to the blank diameter as shown in figure 15. This will relieve the pressure somewhat on the first and last threads to prolong thread roll life and insure better end threads. A thread relief is also advisable to allow the roll to overhang the blank.

It is feasible on large diameter work to have the thread roll a diameter approximately equal to the diameter of the work. On small work, however, it is necessary to use a thread roll which is larger than the blank to secure effective results and retain proper roll life. When thread roll and blank diameters are approximately the same a single-threaded roll is used to form a single thread on the screw. When thread rolls are larger than the work they are made in multiples of the blank diameter, and will have two, three, or more threads as governed by the difference in the di-

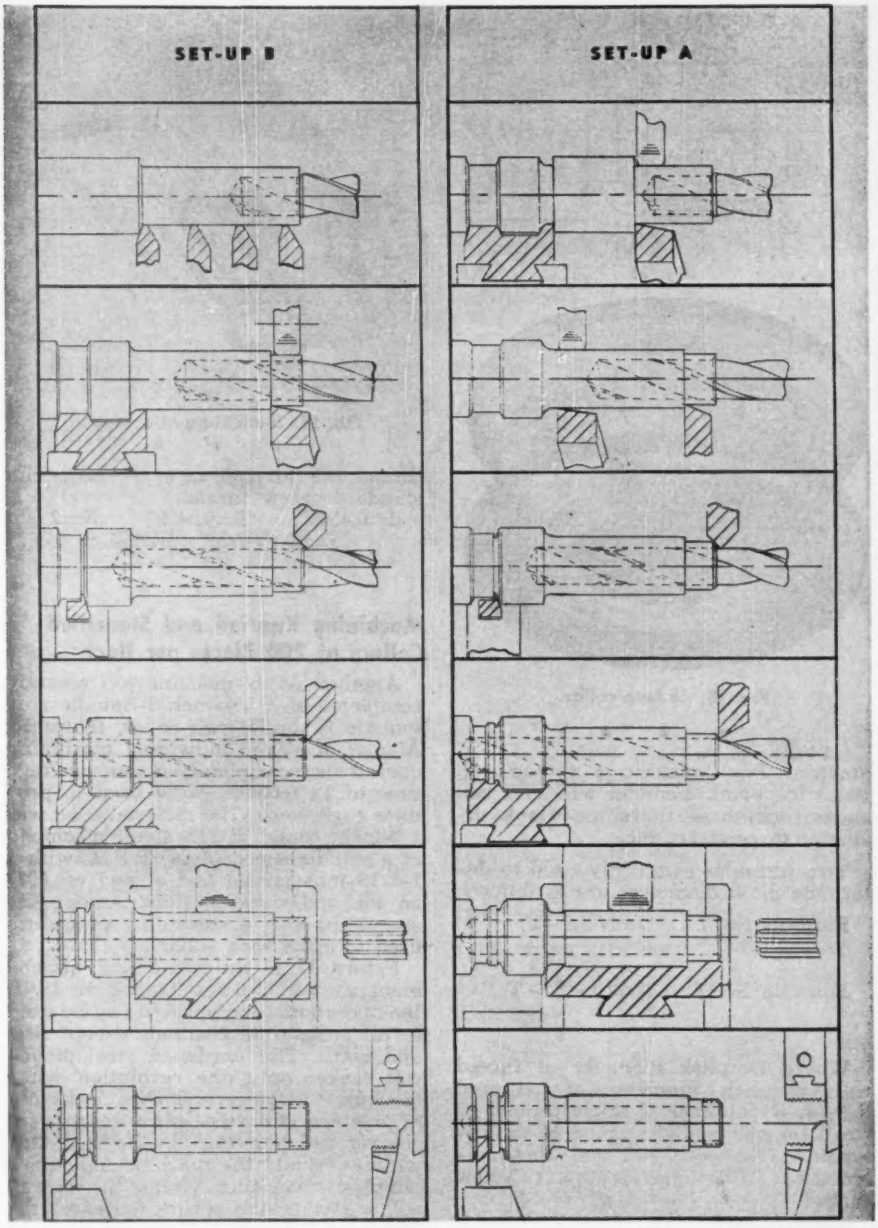


Fig. 14. Comparison of different set-ups. Set-up (A) will do the job faster than set-up (B).

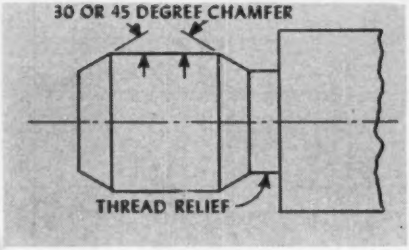


Fig. 15



Fig. 16. ¾ inch collar.

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ameters. For instance, a thread roll twice the blank diameter will have two starts; one three times the blank diameter three starts, etc.

Two formulas commonly used to determine pitch diameters are as follows:

Formula No. 1 $D = \frac{N\ (d - T)}{3}$

Formula No. 2 $N = \frac{(d - T) - T}{4}$

Where D=pitch diameter of thread roll; d=pitch diameter of required thread; N=number of single threads or starts on roll (as determined by the relationship between roll and blank diameters); T=single depth of screw thread.

EXAMPLE—
Find the pitch diameter of a double-thread roll for rolling a ½" American standard screw thread;

d=0.4500" T=0.0499" N=2

$$D = \frac{2\ (0.4500" - 0.0499")}{3} = 0.867"$$

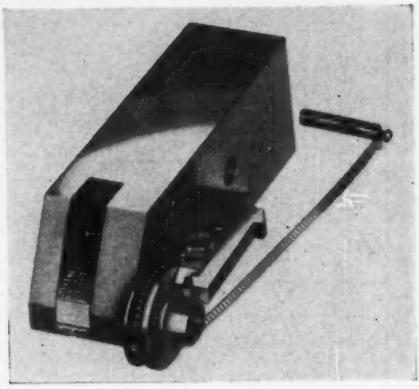


Fig. 17. Stencilling attachment.

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Machining Knurled and Stencilled Collars at 200 Pieces per Hour

Another screw machine job recently completed on a 1⅝-inch 6-Spindle Automatic is the ¾-inch collar, figure 16. A total of eleven individual machining operations, completed in an average time of 18 seconds, were used to produce each piece. The material used was 1½-inch round B1113 steel, machined at a spindle speed of 545 R.P.M. with a 1-1/16-inch stroke and a feed of .0077 on the end-working slide. Among the operations was a stencilling procedure used to mark each collar.

Figure 17 is the stencilling attachment used in the set-up. Figure 18, is the operational sequence. It can be used in all cross slide positions except first and sixth. The hardened steel stencil roll makes only one revolution when marking the piece and then locks out of contact with the work to prevent scoring and blurring. As the tool slide withdraws and the machine indexes, a tripping mechanism frees the stencil roll, allowing the spring to re-set the attachment for the next piece.

THE END

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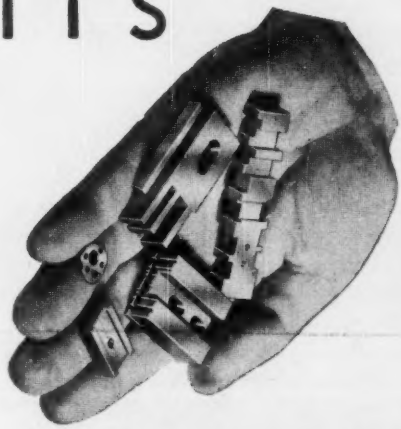
IF IT FITS

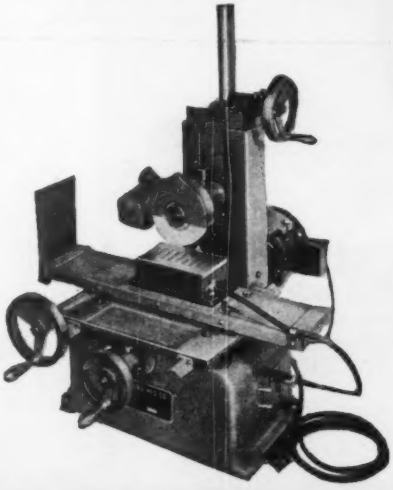
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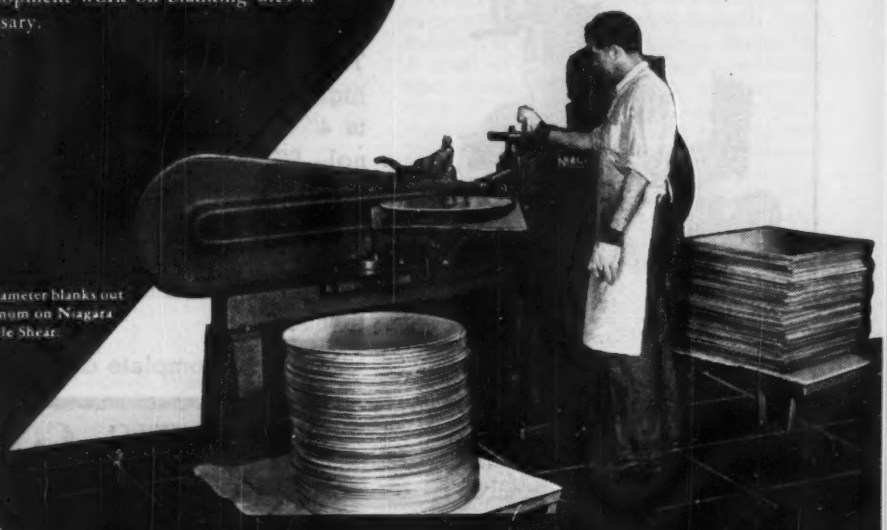
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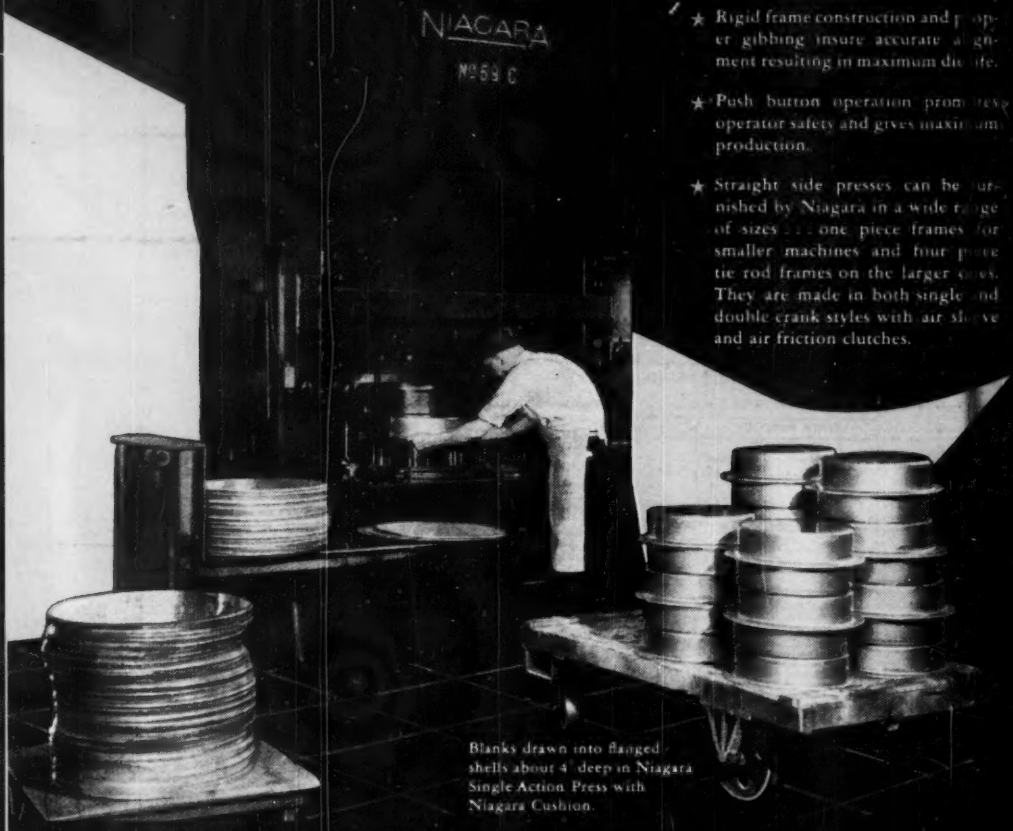
★ Less set-up time is required than in a double action press where two slides must be adjusted for each thickness.

★ Simple drawing dies are used. The initial cost and maintenance are held to a minimum.

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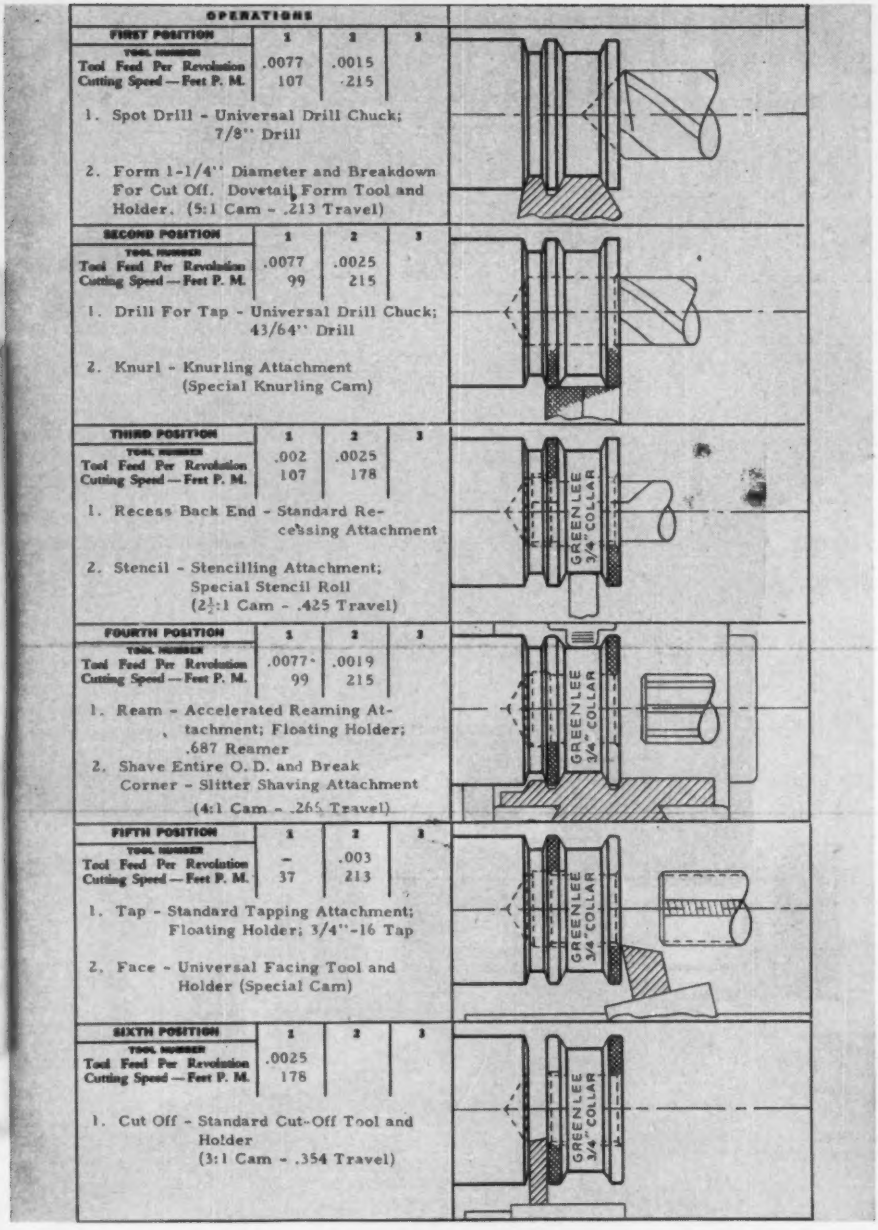
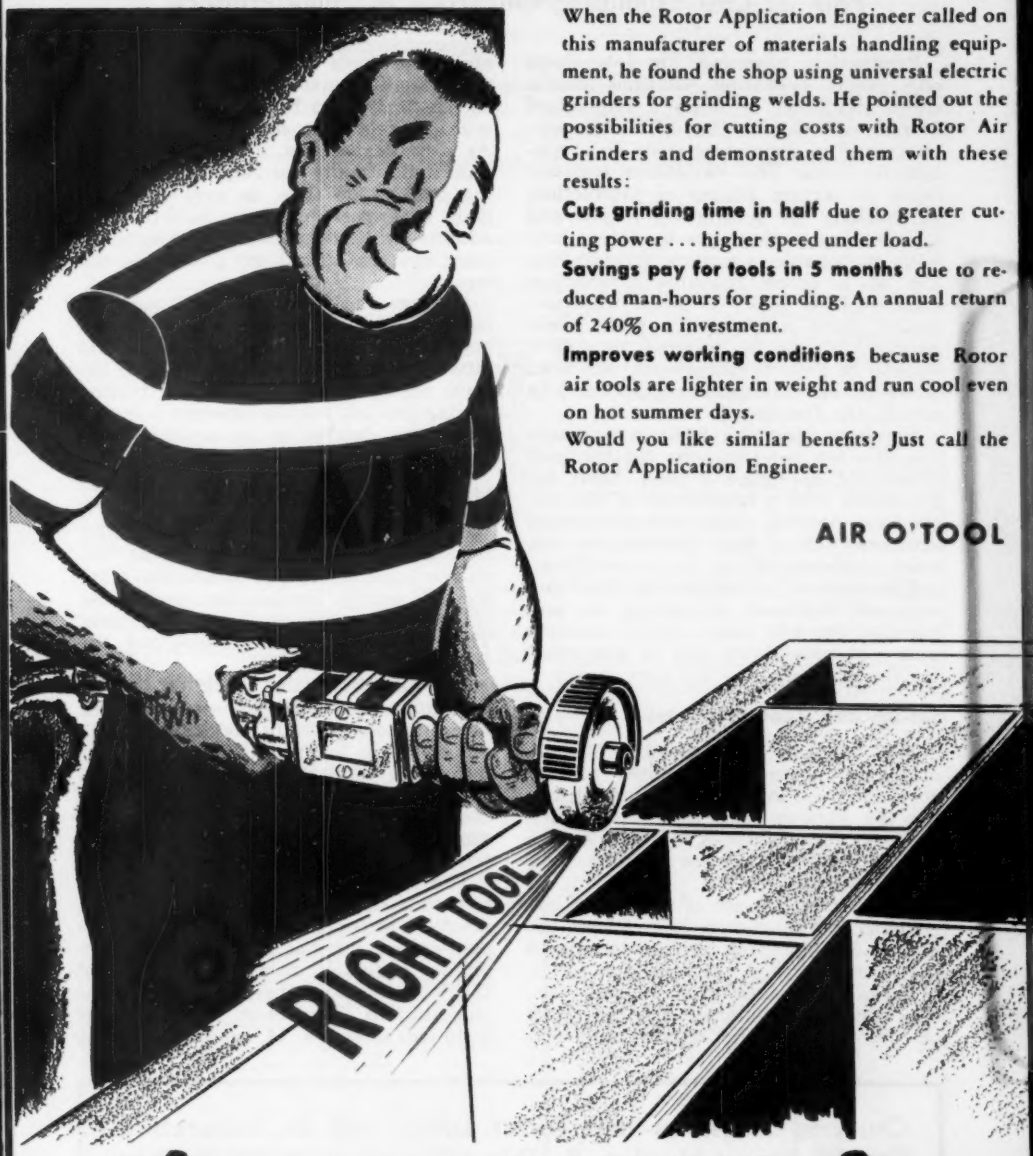


Fig. 18. Operational sequence of figure 16.

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Part 2. Cost Estimating On Screw Machine Products

Production planning for job shops and plants operating multiple-spindle screw machines is often a haphazard arangement due to the difficulties encountered in estimating costs on a systematic basis. The variations encountered in certain phases of production, particularly in setting up a job and maintaining tooling, can be determined with reasonable accuracy through the use of a screw machine production form such as figure 1. While this particular form may not fit your needs exactly, it can be tailored to suit a variety of shop requirements, and does serve as an invaluable record on jobs which are frequently rerun.

To show how the form is put into use, the job specifications for the part illustrated in figure 2 have been reproduced, with a breakdown of the set-up time, tooling time, and production estimates. Once this information has been determined, it is a relatively simple matter to analyze the time and expenses involved in setting up and running the job, and a fairly accurate unit cost breakdown can be computed for the part.

Set-Up and Tool Estimates

The basis of the procedure lies in obtaining accurate estimates of the costs involved in setting up and adjusting the various tools and attachments used on the machines, as well as the replacement of dull, or broken tools during the job run.

These estimates are of particular importance on short-run jobs, where the set-up and tool life factors become a substantial part of the total job time.

There are a number of variable factors which affect the set-up time, such as the skill of the operators, availability of tools and other equipment, plant facilities, etc. A reasonably accurate estimate can be made in any shop within a relatively short period of time. As a matter of fact, constant revisions will undoubtedly be required in tooling and set-up time, as new operators gain in experience, new facilities are added, and better methods and applications are discovered for producing the work.

Having once obtained an accurate estimate of the time required to mount and adjust screw machine tools and attachments during the set-up, and the time required to maintain the tooling during the job run, it becomes a simple matter to determine an accurate cost breakdown for these factors.

Stock-Up and Cycle Time

Actual production of the work after the set-up has been completed involves a consideration of several other factors which cannot be overlooked when making the production estimate. These are the stock-up time and the machine cycle time.

The length of the work to be run determines how often the machine must be restocked to obtain the desired number of pieces in the lot. In this computation the total length of the part includes the cut-off and facing widths. Stock length is another factor which must be considered, since short bars require reloading more often.

The index cycle time is non-productive time and must be considered also. Another important item which is often overlooked, yet has a noticeable effect on the prduction rate is the length of the working hour used as a basis for computation. The chart used in this instance shows a 54 minute hour as

Chucking Machines and Turret Lathes will be featured in Special Report Number 8. This will appear in the January issue of Machine and Tool Blue Book.

Customer [redacted]			Part No. FC 146-2
			Date March 17, 1950
Address [redacted]			Dept. #69
Part Name		Machine Size 1 5/8" - 6	Machine R.P.M. 505
Material Type 416 Stainless Steel		Collet Size 1 9/16"	S.F.P.M. 151
No. Pcs. Per Lot Run 25,000		Speed Gears 53-55	Tool Slide Stroke 3/8"
No. Days Per Lot Run 13 @ 8 hrs.		Feed Gears 35-39	Feed Per Rev. 0.0054"

TOOL CHANGES	Set-Up Time	Tooling Time
4-Drills (25 min. each)	100	20
1-C'Bore	25	10
1-Knee Turner	15	5
3-Rough Form Tools	80	30
1-Finish Form Tool	25	10
1-Cut-off Tool	20	5
Total Time (Min.)	265	80
MACHINE CHANGES		
Including collets, pushers, collet tension, stroke, forming cams, stock stop, cam drum strips, feed and speed gears, and coolant fittings.	165	
TOTAL TIME (MIN.)	430	80

TIME LAYOUT		
Length of Part 0.562"	Pcs. Per Bar 200	
Cut-off Width 0.125"	Pcs. Per Load 1200	
Face Off 0.010"	Cycle Time 0.1666 min	
	Gross Prod. Per Hr. (54 min.) 324	
Total Length 0.697"	Gross Prod. Per 8 Hr. Day 2592	
STOCK-UP TIME		
Load Time / Bar 1.0 min.	x 6 Spindles 6.00 min.	
Cycle Time 0.1666	x 6 Spindles 1.00 min.	
Time Per Piece 7 ÷ 1200 = 0.00583 min.		
TOOL TIME		
Gross Prod. 324	x 8 Hrs. 2592	
Time Per Piece 80 min. ÷ 2592 pieces = 0.0308 min.		
1 - Cycle Time	0.1666	
2 - Stock-up Time	0.0058	
3 - Tool Time	0.0308	
TOTAL TIME PER PC.	0.2032	
Hourly Output 265 Pcs. @ 81.8 % of Gross		
NET PROD. PER 8 HR. DAY 2120 pieces		

Fig. 1. A typical screw machine production form.

• • •

standard, but this figure may have wide variations for different establishments.

Tool Time per Piece

With the accumulation of the data discussed above, the tool time per piece can be accurately calculated. The stock-up time, cycle-time, and tool care time are added and this total substracted from the gross time per piece to obtain the net time required to produce each piece. Note that the set-up time has not been included in this computation, since it can be charged against the job as a

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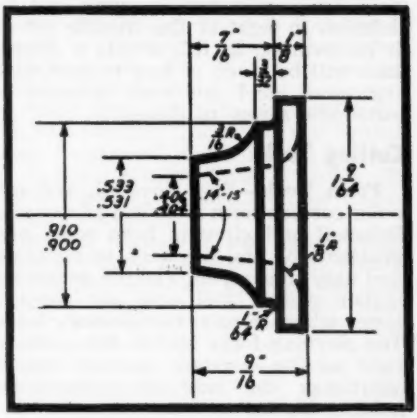


Fig. 2.

Tool Name	Minutes Allowed Each Tool*
Chamfer	5.00
Facing	5.00
Box Tool	5.00
Cut-off	5.00
Recess	5.00
Drills	5.00
Knurls (Remove and Replace Only)	5.00
Chasers	5.00
Tap	5.00
Reamer	7.50
Form Tool	9.75
Shave Tool	9.75
Oil Drill	8.00
Counterbore	5.00

*To Remove and Reset

• • •

Fig. 3.

lump sum and this simplifies computing the machine time.

Having determined exactly how long each piece will require for complete machining, it is a simple matter to estimate the time needed for the total job run, adding, of course, the set-up time. Material and labor costs are then allocated accordingly for a final analysis of the over-all job estimate.

Figure 3 gives the approximate time required to remove and reset the most commonly used screw machine tools. This estimate is presented only as a guide. These figures may vary widely in different shops, so revisions may be necessary for particular applications.

THE END.

Part 3. You Can Use Carbides on Screw Machines

There is still much to be learned about the use of carbides on screw machine work; however enough work has been accomplished by the manufacturers of carbides and the machine tool builders to serve as guide posts to correct procedure. Turning, boring, facing, and form tools, have been in use for some years. More recently, it has become possible to obtain carbide drills and chasers for special jobs. Even so, there is much to be learned and the user frequently has to work out his solution in light of the specific job he is performing. In this article a general idea will be given of how to start tooling up a steel job with carbides on automatic screw machines.

Cutting Tools

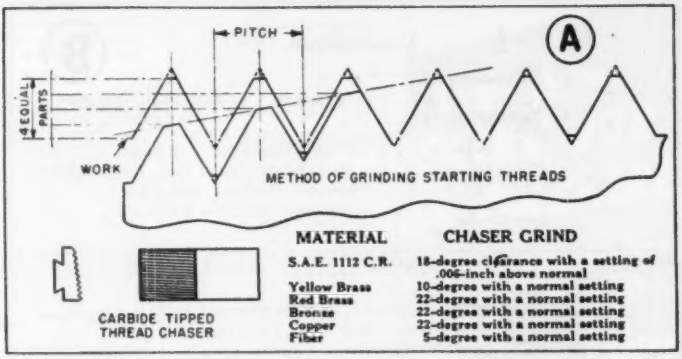
Form Tools—Fiat, dovetail, and circular carbide form tools can all be used. Dovetail and circular form tools give greater tool life, are easy to maintain, and easy to sharpen. Though somewhat higher priced, tool cost per piece is lower where runs are sufficiently large. The circular form tool is not quite as rigid as the dovetail since it usually overhangs the side of conventional holding blocks.

Form tools up to 2" wide are being used successively. Wider tools work well where forming slides are strong and rigid enough to prevent chatter. Best results in cutting wide forms are obtained if the tool is broken up into several simple components. This simplifies tool grinding and decreases the peak power requirement for forming. The simpler form tools also can be obtained by simply re-grinding standard catalog tools, reducing tool cost.

Usual objections to the breaking up of form tools do not apply to carbides downtime less; and possible increases in setup complication can be offset by use of calibrated toolposts and tool slides, cartridge type tool holders, and setting gages.

Satisfactory performance is usually obtained on low carbon steels with form tools having 0° top rake, 3° to 5° front clearance, and 3° side clearance on all shoulders.

Some failures with carbide form tools have been caused by using very thin tips on existing HSS tools in insufficiently rigid holders, instead of using regular carbide tools in sturdy holders, thus depriving the carbide of adequate support.



Speeds and Feeds

Speeds for machining steel with carbides are about 3 times those normally used with HSS tools. Feed per revolution is limited by width of form, due to the horsepower required to remove metal. Heavier feeds can be used with narrower form tools. Shape of form also has a bearing on feed per revolution. A tool with a large radius will be more apt to wedge chips, putting greater pressure between the work and the tool, generating more heat, and possibly developing chatter. This condition would be aggravated where a tool has more than one large radius. In such a case, the form may be split up into several simple tools. A good rule of thumb is to start with .003" feed per revolution for rough forming and .001" feed for finish forming.

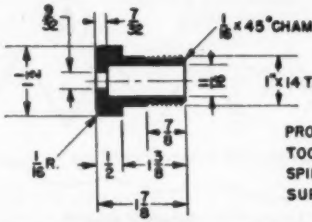
With forming, as much stock as practical should be removed during the roughing cut. As the diameter of the part decreases, it becomes weaker and may cause vibrations or chatter at the high speeds and lighter feeds used for finish forming. A heavy feed on the rough form holds chatter and vibration to a minimum. Only a little stock is then left for the finish form tool which can operate at a lighter feed per revolution.

A point to remember in cam design when carbides are used is that dwell should be reduced in view of the higher cutting speeds. Use of the customary length of dwell results in the tool merely riding the work with resultant lapping and possible dulling of the cutting edge. In general, dwell should be held to a minimum in finish forming. In rough forming, it may well be eliminated altogether.

Cut-Off Tools—In cutting off steel tubing or work with a hole, good results are usually obtained by applying conventional techniques to carbide tools. When cutting off bar stock to dead center, good results are being obtained by splitting up the cut—starting with a carbide breakdown tool and, after workpiece diameter has been decreased,

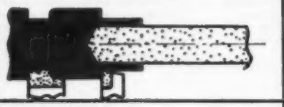
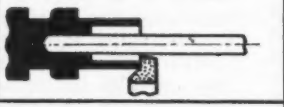
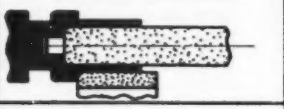
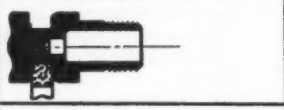
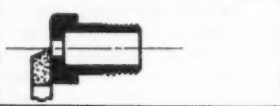


"Probably one of the horizontal milling machine operators."



B

PRODUCTION TIME - 15 SECS.
TOOL SLIDE CAM - 1 IN. FEED - 006 IN.
SPINDLE SPEED - 806 R.P.M.
SURFACE SPEED - 316 FEET

MACH. POS.	OPERATION SEQUENCE	TURRET	CROSS SLIDE
1		11/16 CARBIDE DRILL KNEE TOOL CARBOLOY 883	DOVETAIL FORM CARBOLOY 78-B
2		11/16 CARBIDE DRILL KNEE TOOL CARBOLOY 78-B	
3		9/32 H.S.S. DRILL KNEE TOOL FACE & CHAMFER CARBOLOY 78-B	
4		FORM DRILL CARBOLOY 78-B	DOVETAIL FORM CARBOLOY 78-B
5		THREAD 1"x14 CARBOLOY 78-B	BREAKDOWN CARBOLOY 883
6			CUTOFF CARBOLOY 883

using HSS tools for the final cut-off to dead center. If more than one carbide breakdown tool is required, each tool following the first should be about .005" narrower.

On long run jobs, distance between cutting edge and holder can be set so that the chip will curl against the holder, forming a clock-spring type chip. For shorter run jobs, a standard groove or step type chip breaker can be ground into the tool.

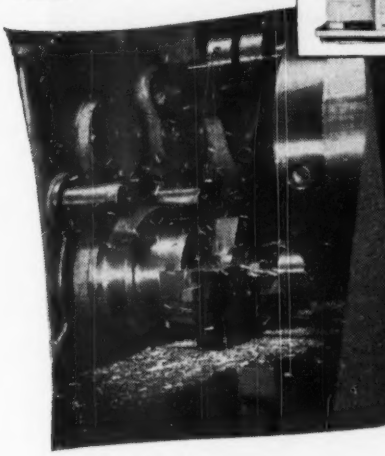
Drills—No definite standards for carbide drills have been established. Most large drill manufacturers now furnish carbide drills.

Several types of carbide drills (solid and tipped) have been used to drill brass, bronze, aluminum, plastics, cast irons, and low-carbon free-machining steels such as SAE 1020, SAE 1113, and X1112.

Carbide drills should be run about 3 times faster than HSS drills. Feed per

Showing drill in No. 3 turret position backing out as front and rear slide carbide tools form and face the o. d. and end of the piece. High speed camera has stopped chuck revolving at 1050 rpm. Note chips suspended in mid-air.





Ever see a CHUCKING JOB in a BAR MACHINE?

Here's how the New Dialmatic CLEVELAND does it!

6 operations on pump valve seat in 47 seconds!

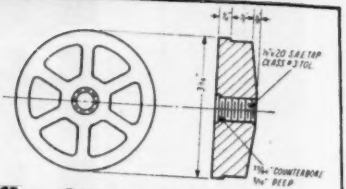
Convertible in 30 minutes—either as a bar machine or a chucker—the new Dialmatic Cleveland *doubles* the utility range of single spindle automatic screw machine production.

Cleveland's Model AB 2½" Dialmatic is fast and accurate—rigid and powerful—with feeds and speeds (24—1820 rpm) that get the *most* from carbides. Set-up time is short. Forward and return feeds for turret tools are electrically controlled—simply set by dials on the control panel. Double cross slides operate by standard adjustable cams. Set-ups and adjustments are made quickly and accurately.

Get the full story on the new Dialmatic Cleveland. Write for bulletins. And if you are now producing duplicate parts up to 2½" diam. from bar stock, or chucking work up to 6" diam. or larger (depending on o.d. of end to be gripped), send us your part prints and let us show you how profitably the new Dialmatic Cleveland will do it!

Remember,

Cleveland's Cut Costs—



PIECE: Pump valve seat
MATERIAL: Gun metal bronze sand casting

First operation sequence

Spindle rpm	Turret positions
1050	(1) Spot .375" @ .020" feed
	(2) C'Bore .375" @ .020" feed
	Rear slide face 1.343" @ .0045" feed (3) Drill 1.000" @ .020" feed Front slide form o.d. @ .0045" feed to 3 1/16".
	(4) Open and skip-index
336	(5) Tap

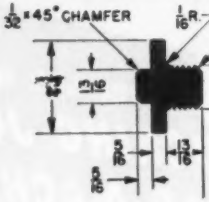
Floor-to-floor time: 47 seconds
Class 3 fit on thread

THE CLEVELAND AUTOMATIC MACHINE COMPANY

4934 Beech Street
Cincinnati 12, Ohio

SALES OFFICES: CHICAGO
CLEVELAND • DETROIT
HARTFORD • NEWARK

Manufacturers of a Complete Line of Single Spindle Automatic Screw Machines and High Pressure Hydraulic Die Casting Machines



MACH. POS.	OPERATION SEQUENCE	TURRET	CROSS SLIDE
1		KNEE TOOL CARBOLOY 78-C	DOVETAIL FORM CARBOLOY 78-C
2		KNEE TOOL CARBOLOY 78-C	DOVETAIL FORM CARBOLOY 78-C
3			DOVETAIL FORM CARBOLOY 78-C
4		KNEE TOOL FACE & CHAMFER CARBOLOY 78-C	DOVETAIL FORM CARBOLOY 78-C
5		THREAD H.S.S.	
6			CUTOFF H.S.S.

revolution should be from .004" to 010", depending on drill size. Less than .004" usually causes rapid cutting edge wear with a build-up on carbide.

For maximum rigidity, the drill should be as short as possible. This does not sacrifice drill life, since sharpening does not shorten a carbide drill to the same extent as HSS drills.

When drilling steel, it is preferable to spot drill first. "Oil hole" type drills (such as the "all depth" drills) should be used for holes ½" in diameter and larger. A large volume of coolant must be supplied to the end of the tool. Holders must be strong and absolutely concentric.

Carbide Tipped Chasers—With carbide tipped chasers, spindle speeds need not be reduced for threading. More pieces per grind ars also frequently obtainable, and finish is improved. If desired, HSS chasers, taps, and drills can be used in revolving spindles in the turret to decrease effective cutting



Representation throughout Industrial America

Micro-metric jig-bored die sets in commercial or precision grades are available to you through the **DETROIT DIE SET** representative in your community. Phone or write for prompt delivery of standard and special die sets and high-precision die maker's supplies.

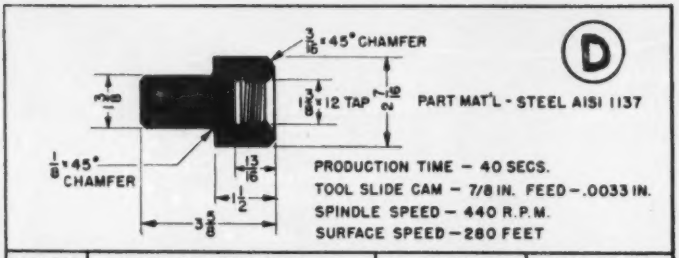
CALL "DETROIT"

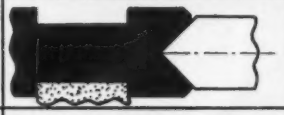
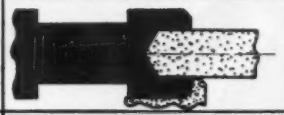
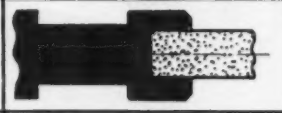
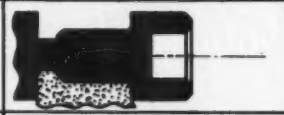
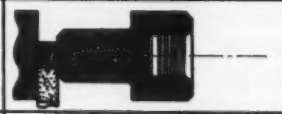
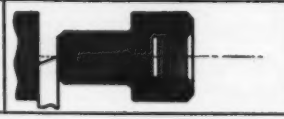
DETROIT	TR 2-5150
BIRMINGHAM, ALA.	7-4121
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MONTREAL, CAN.	WI 1586
PHILADELPHIA	VI 4-4084
PITTSBURGH (Perrysville)	3-3703
ROCK ISLAND, ILL.	R 2-814
ST. LOUIS	FR 6R1
ST. PAUL	CE 1600
SEATTLE	LA 7109
TOLEDO	GA 5706
TORONTO, CAN.	PL 3813
WICHITA	5-8681
WINDSOR, CAN.	2-1575

DETROIT DIE SET CORPORATION

2895 W. GRAND BLVD. • DETROIT 2, MICHIGAN

DETROIT DIE SETS ★



MACH POS.	OPERATION SEQUENCE	TURRET	CROSS SLIDE
1		1½" DIA. H.S.S. DRILL	DOVETAIL FORM CARBOLOY 78-C
2		TAP DRILL CARBOLOY 78-B	DOVETAIL FORM CARBOLOY 78-C
3		FORM DRILL CARBOLOY 78-B	
4			DOVETAIL FORM CARBOLOY 78-C
5		BREAKDOWN CARBOLOY 883	1 3/8 x 12 THREAD H.S.S. TAP
6		CUTOFF H.S.S.	

speeds (in SFPM) for these tools while maintaining full machine speed for the carbide tools.

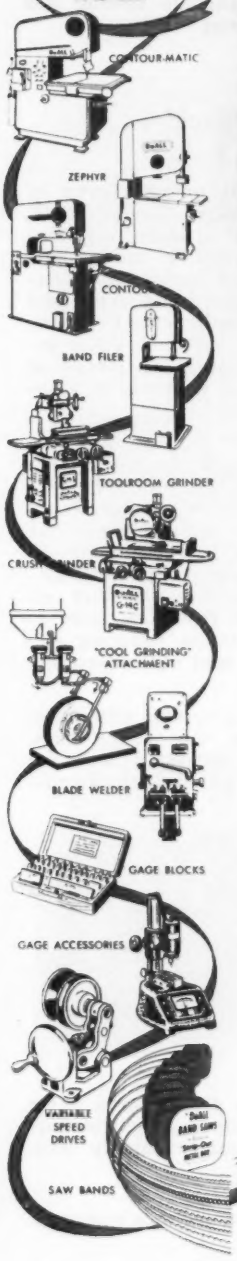
As for other tool holders, use of a size larger die head has been found useful with carbide chasers in one plant in view of the greater steel backing and rigidity. This plant also developed its own method of grinding the starting threads on the chasers, drawing A. Type of threading is relatively limited with chasers so ground, however. They are well suited, nevertheless, for stud threading or work where the thread is not too close to a shoulder. For SAE 1112 C. R., these chasers were given an 18° clearance with a setting of .006" above normal.

Grade of Carbide

In general, the same carbide grades are used for screw machine work as for other types of machines; that is, Grade 78B for average and heavy cuts and Grade 78 for lighter cuts. Where no experience has been had with carbides, it

DoALL

TOOLS DO ALL JOBS FASTER!





Again GAGE BLOCKS Become "Strategic" Equipment

Production depends upon unfailing interchangeability of parts — accomplished *only* through the use of accurate gage blocks.

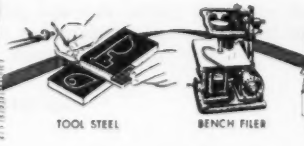
Your Local DoALL Representative has a Kit to Prove the Superiority of DoALL Gage Blocks —

1. Surface finish superior to any other gage block — three-tenths of one micro inch RMS or better
2. Burr-Proof edges (exclusively DoALL) prevent formation of nicks and burrs during usage
3. Guaranteed stability that prevents "growing" and "shrinking"
4. More uniform hardness — between 65 and 66 Rockwell C
5. Flattest and most parallel gaging surfaces — plus or minus .000003"
6. Fitted in most convenient, easy-to-use carrying case
7. Priced lower than ordinary gage blocks
8. All gage blocks are subject to change and wear, and must be inspected regularly. DoALL has a complete inspection and calibration service, plus a completely integrated set of gage block accessories, to increase the usefulness of gage blocks

***Therefore,* DoALL GAGE BLOCKS**

- **HAVE THE MOST RELIABLE ACCURACY**
- **ARE EASIER TO WRING TOGETHER**
- **LAST LONGER**

Get the proof from your DoALL man. Write us today!



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Des Plaines, Ill., U.S.A.

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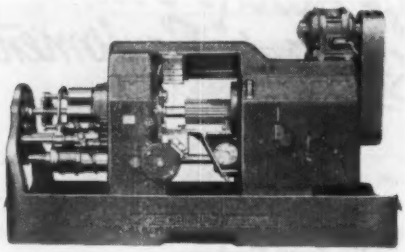
is a good idea to start with the "tough" grades. Grade 883—generally used for machining cast irons and non-ferrous materials—frequently works well on steel, especially where feeds are light and the cam dwell is long.

Drawings B, C, and D show a few typical automatic screw machine job layouts in which carbide tooling has been successfully employed.

Part 4. Descriptions of Late Model Screw Machines

National Acme 6-spindle RB

The RB, made by the National Acme Co.. Cleveland, O., achieves accurate and permanent alignment of tools with the work of mounting the end tool-slide around an alloy steel hardened stem which is integral with the spindle carrier. A modified and refined Geneva mechanism starts the spindle carrier indexing from a standstill, rapidly accel-



erates, then decelerates, bringing the movement to a dead stop without shock before the positive locking pin is engaged.

Each standard tool slide is operated independently of the others and has an adjustable positive stop which engages a hardened stop on the periphery of the spindle carrier.

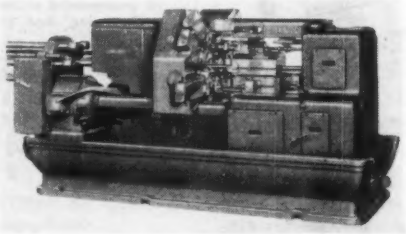
On 6 and 8 spindle machines provisions is made for mounting two centrally located side slides on the face of the headstock housing adjacent to the second and fifth spindle positions on the 6 spindle machines and third and sixth spindle positions on the 8 spindle machine. These intermediate slides are each independently controlled. They provide for widely diversified side tooling operations in keeping with the increased number and styles of end working tools made possible by six and eight spindle design.

Greenlee 6-Spindle

This versatile unit, manufactured by Greenlee Bros. & Co., Rockford, Ill., incorporates several cost-cutting features which are stated to reduce set-up time, tooling and maintenance expense. A built-in threading drive and feed is standard equipment. Compensating stops on the forming slides insure precise duplication of pieces at each spindle position, essential in long-production runs.

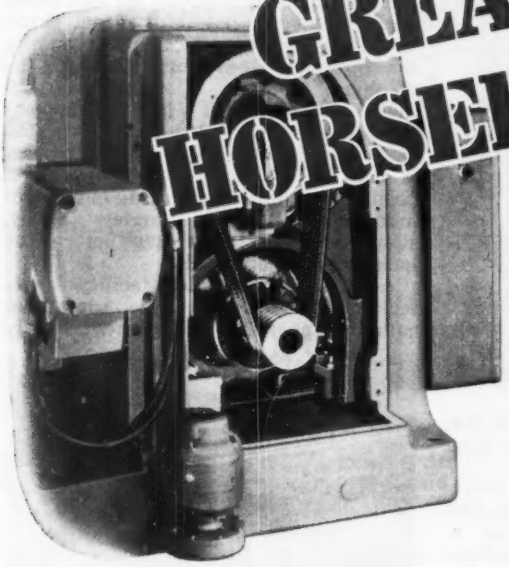
The standardized tooling of these units enable considerable savings in costs, since a variety of machining operations can be handled with a minimum of tools and holders. All cross slide cavities, for example, are identical—all tooling being completely interchangeable. The standardized tool holders can be quickly changed from one slide to another for new set-ups, reducing expensive down-time and cutting equipment expense.

A built-in coolant system eliminates awkward piping in the tooling area, while insuring extended tool life through the proper distribution of cool-



ant. The wide-open tooling area helps to make set-ups easier, precision adjustments can be made quickly with less operator strain.

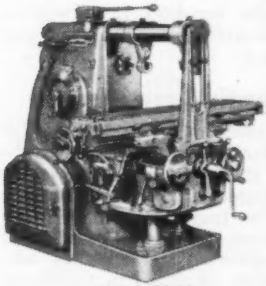
GREATER HORSEPOWER



The increasing use of carbide and cast alloy tools for milling ferrous and non-ferrous materials, has demanded Greater Horsepower to get fullest advantage of these tools. You'll find new CK milling machines meet this demand. Depending on machine size, (No. 2, 3, 4, 5, or 6) you get 10 to 25 hp independent motor drive for spindle plus separate 3 to 5 hp feed and rapid traverse drive. Motors are interlocked with positive automatic safety control for overload conditions. No danger of stalling cutters in cut.

A new line of knee-type milling machines

KEARNEY & TRECKER MILWAUKEE **CK's**



New Model CK
10 hp No. 2 Plain Style
Milling Machine

YES, Kearney & Trecker's new CK milling machines are packed with design and operating features that make them more productive, more profitable for you.

New CK columns give you greater rigidity. Compared to former columns, they give you 1000 pounds more metal in heavier ribbing, in box-type, sponson construction to absorb the heaviest cutting loads.

Spindle-mounted flywheel, broad feed and speed ranges plus Greater Horsepower give you the opportunity to obtain fullest possible benefit from modern cutting tools.

New design 2" diam. table feed screw affords greater bearing contact between screw and nut and is equipped with positive-acting backlash eliminator. Features that guarantee smoother feed for conventional and climb milling, longer screw life and greater accuracy.

For greater production, these machines are equipped with Kearney & Trecker's famous Mono-Level Control that shortens floor-to-floor time, and materially reduces operator fatigue. New, non-glare micrometer dials help avoid costly errors in reading . . . give you a positive lock at every setting.

Automatic flood lubrication in column and knee and positive metered lubrication to table and saddle, plus generously proportioned gears and shafts assure you greater machine life.

Find out for yourself about Kearney & Trecker's new CK line of knee type milling machines . . . how they meet every demand of modern milling practice . . . how they can give you greater production at greater profit.

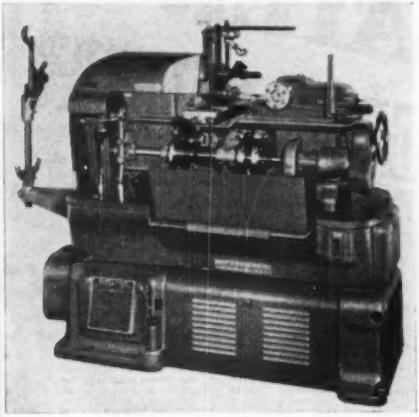
Sizes are No. 2, 3, 4, 5, and 6 . . . Plain and Universal styles. For complete details, contact your nearest representative or write direct. Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wisconsin.

REPLACEMENT OF OBSOLETE MACHINE TOOLS IS AN INVESTMENT THAT MAKES BOTH DOLLARS AND SENSE.

KEARNEY & TRECKER MILWAUKEE MACHINE TOOLS

Brown & Sharpe Model 2G

The Model 2G Automatic Screw Machine and 2G Automatic Cutting-off Machine, made by Brown & Sharpe



Mfg. Co., Providence, R. I., permit the maintenance of closer limits, finer finish and more uniform production.

The spindle has a positive chain drive at all speeds and is provided with 196 two-speed combinations including a wide range of high to low speed ratios. This wide selection makes possible the use of correct speeds for forming, drilling, and similar operations. Equal cutting efficiency is obtained on all materials from tough alloy steels to free-cutting plastics and on a wide range of work diameters.

Full anti-friction bearing spindle is used in the 2G. Spindle speeds changed by pick-off gears. Production rates vary from 3 seconds to 8 minutes per piece depending on the job.

Automatic and uniformly rapid idle movements result in high cutting efficiency. Design of the machine permits rapid set-up for both new work and for repeat jobs.

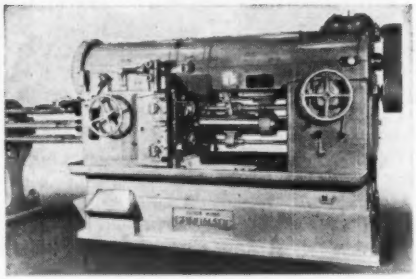
Wide variety of attachments are available for increasing versatility.

Cone 6-Spindle

This 6-spindle machine, made by Cone Automatic Machine Co., Inc., Windsor, Vt., features open-end attachment gearing, immediate power feed engagement and reverse power feed control which greatly facilitate quicker tool-ups and change-overs. The overhead single unit camshaft is a Cone exclusive. It centralizes, times and controls all the automatic movements of the machine and supplies all tool slides with a smooth, powerful direct drive. as well as making all cams available to the operator from both sides of the machine.

The camshaft is in a convenient position in the heavy top-bed above the work and tooling area. Spindle carrier is held in a solid wall of support. A positive, modified Geneva movement indexes the spindle carrier rapidly, slowing it to a dead stop before the locking pin is engaged.

Additional cross slide facility is offered by a universal slide, sometimes called a taper turner attachment. It may



be mounted on the milled section on either side of the top-bed. It is capable of taper undercutting, necking, facing, cutting off, etc.

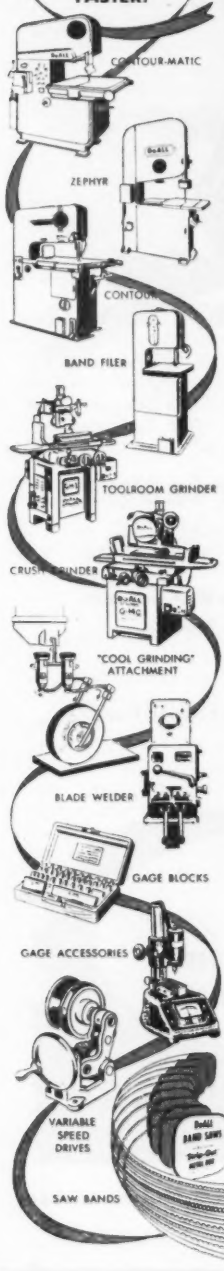
Johnson Automatic Screw Machine

In the Johnson machine, made by Johnson Automatic Machine Co., Westfield. Mass., there are no cams to change for changeover. One set answers for all jobs. The travel of the forming arm, cut-off arm, and stroke of drill spindle are regulated by segment adjustment. Position of studs in segments or cross slides and drill arm, determines the throw, movement or length of travel of the tools. Cycle of operation varies from 1.5 seconds to 60 seconds, changed by substitution of cycle gears.

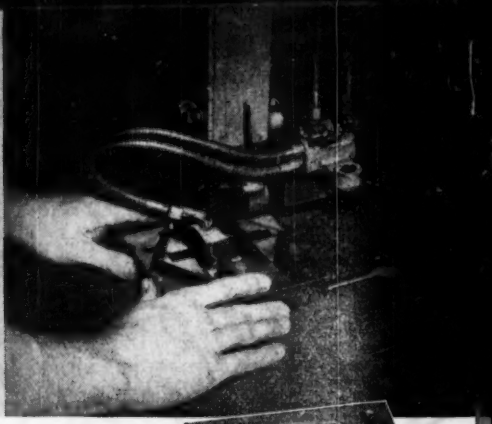
Mounted in the base of the machine is an electric fractional horse power

DoALL

TOOLS DO ALL JOBS FASTER!



NEW MACHINING TECHNIQUE *Line-Grinding*





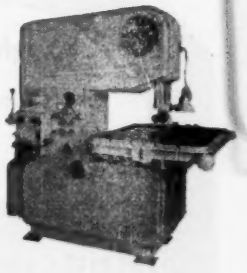
Broken die salvaged at low cost by replacing the damaged section after its removal by Line-Grinding. It required only 6 minutes to remove a square inch of Ketos steel hardened to 59 Rockwell C

It is now possible to do rapid machining and shaping of HARDENED STEEL and extremely ABRASIVE or BRITTLE MATERIALS with spectacular new, low-cost Band Tools developed for use on the DoALL Contour-matic.

Vertical Line-Grinding and Honing as done by the hydraulically operated Contour-matic and this new DoALL Band Tool offer you these advantages:

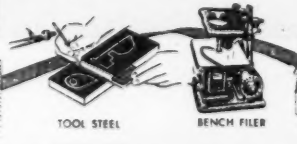
1. **Machines without length or depth of cut limitations**
2. **DoALL Line-Grind Bands come in various grit sizes of aluminum oxide or silicon carbide, to facilitate machining operations previously impossible**
3. **Accurate machining to either straight or curved layout lines**
4. **Internal as well as external machining. For internal cut-outs, the Line-Grind Band is threaded through a starting hole in the work and rewelded**





WATCH THEM WORK!

Our Line-Grind demonstrator units are available to show you this new time-saving technique. Write today for free demonstration in your own plant.



The DoALL Company

Des Plaines, Ill., U.S.A.

Cable Address: DoALL Des Plaines

DoALL Stores In Key Cities

Factory Trained Representatives Everywhere

WHY LENOX HACKMASTER USERS ARE—

Sitting on top of the World!



ECONOMY

Do not break – no loss from breakage of partially worn blades.

DURABILITY

Made of High Speed Steel that will outlast several standard grade blades.

SAFETY

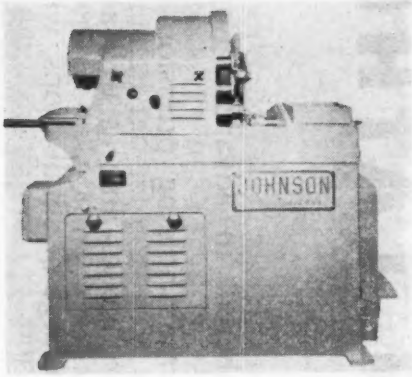
Will not shatter in use. No bruised hands or other accidents.

High Speed Steel

★ *Unbreakable*

Lenox Hackmaster

"A DIFFERENT HAND HACK SAW BLADE"



ratio motor. This motor drives the friction feed mechanism so that when collet opens, the stock feed reel turns, winding in the rope, or cable, attached to stock feed push rod.

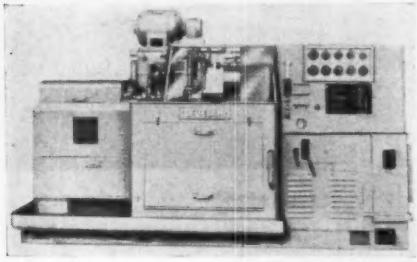
Chips fall into an ample size tote pan located in the base of the machine.

Cleveland Model AB

This single spindle automatic, made by The Cleveland Automatic Machine Co., Cincinnati, O., has separate, infinitely adjustable feeds which can be preselected for forward and return motion of each of the five turret positions. Feed rate for any turret tool can be changed while it is cutting.

Cross slide feeds are controlled by standard adjustable cams; these are easily accessible. One camshaft, which controls all cam motions of the machine, except those of the turret, is located for easy access. A shear pin device protects the machine in case of overload or tool interference.

A disc-type friction clutch which controls the feed of the machine operates automatically from a positive clutch controlled from the camshaft through dogs.

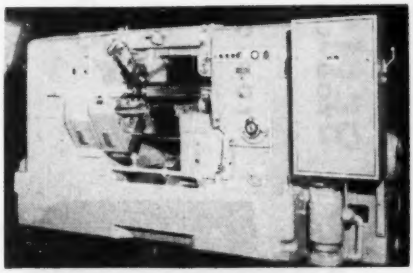


Turret is 15¼" dia. and fitted into scraped bearing. Five turret holes are bored in a 12½" tool circle, in line with the work spindle.

New Britain Model 601

This model, made by The New Britain Machine Co., New Britain, Conn., is massive enough to handle the horsepower required for steady feeds for carbides on tough forming steel jobs. It is also designed for super-high spindle speeds for use with brass and aluminum.

No cam changes are necessary for the main tool slide. Universal cam selects

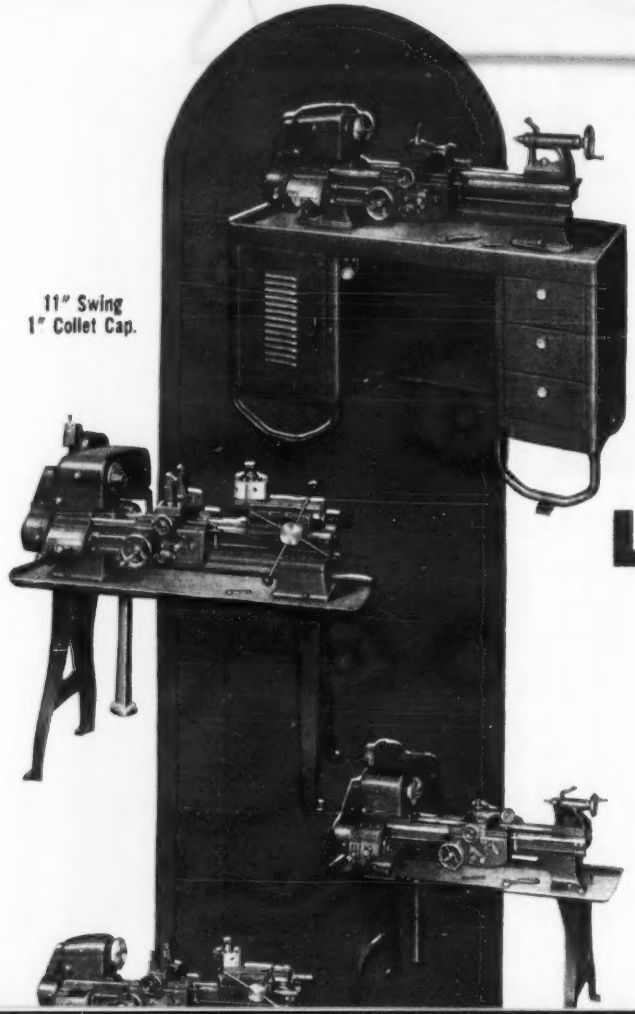


any feed. No cam change is necessary for different feed-out lengths. One stock feed cam handles the entire range. No change in stops, high points, drawback points, total stroke on all cross slides and main tool slide when changing set-ups. Tool holders need not be moved when regulating feed stroke.

Automatic stop shuts off machine and flashes red light when a spindle runs out of stock. Machine will not run when lubricating oil pressure is low.

Producto Form and Cut-Off

This machine, made by the Producto Machine Co., Bridgeport, Conn., is of simple and compact design for high speed external forming, grooving, beveling, chamfering, and cutting-off bar stock work.



11" Swing
1" Collet Cap.

YOU CAN MAKE IT **ACCURATE**

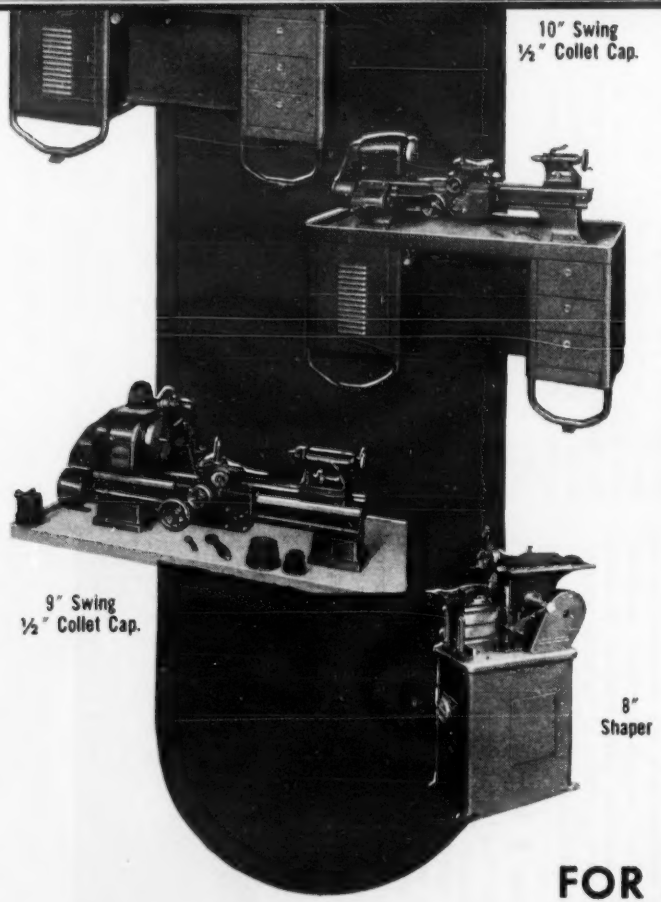
YOU CAN MAKE IT . . . . **FAST**

YOU CAN MAKE IT **FOR LESS**

ON A

LOGAN LATHE

The accuracy inherent in advanced Logan Lathe design permits holding precision tolerances on the production line as well as in the tool room. In large or small shops, wherever the need is for accelerated, accurate parts production and low cost operation, Logan



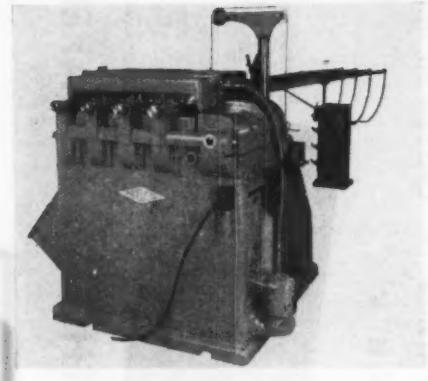
tion. 45 accurate, versatile Logan Lathe models, 9", 10" and 11" swing, ½" and 1" collet capacity, plus a complete line of lathe accessories assure year-in, year-out dependability. For full details on Logan Lathes and on the Logan 8" Shaper, see your Logan Lathe dealer, or write to

LOGAN ENGINEERING CO.
4901 West Lawrence Avenue • Chicago 30, Illinois

LOOK TO



FOR *BETTER* LATHES and SHAPERS



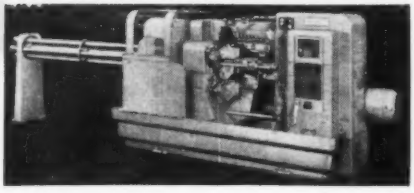
Horizontal, 4-spindle construction, plus new application of pneumatic bar feeding instead of the conventional push fingers, are important features. A simple control permits infinitely variable speeds and feeds without using pick-off gears. Spindle speeds, 900 to 2000 rpm may be maintained to machine complete parts at a rate of 1400 to 2400 pieces per hour. Capacity in diameter is $\frac{5}{8}$" maximum with cut off length to $6\frac{3}{8}$".

All cutting tools are mounted on one slide which is cam operated longitudinally assuring preservation of initial accuracy regardless of variable temperature conditions.

Warner & Swasey 5-Spindle

This machine, made by the Warner & Swasey Co., Cleveland, O., combines the speed and simplicity of a turret lathe set-up with the high production of a multiple spindle automatic.

This machine features the patented quadrant mechanism for adjusting feed strokes. Rather than changing cams, the feed strokes are quickly set by adjusting sliding blocks on the graduated scales of the quadrants. The 24 available spindle speeds are obtained without any changes inside of the machine. 18 rates of feed are constantly available to meet every condition.



All tool slides have a fine adjustment for accurate setting of the stroke limit; the cross slides, with their micrometer dials, can be set as easily and accurately as the cross slides on W & S turret lathes.

Standard Floor and Bench Models

On these machines, made by Standard Machinery Co., Providence, R. I., two separate forming operations or a roughing cut followed by a finishing and cutting-off may be performed on the basic machine. Special attachments are available for drilling or boring. Control and movement of tools are provided at easily selected rates and without gearing. Feeds are adjustable in small increments within the unit's capacity. Feed cam shaft can be disengaged instantly and rotated slowly by hand for the setting of tools.

Formation and clogging of long chips are rendered impossible by an improvement in the method of driving the feed cam shaft. Twice in each revolution of the spindle the rotation of the feed cam shaft is interrupted, thereby effecting an intermittent feed which breaks each chip as it is formed.

Davenport Model B

This model, made by the Davenport Machine Tool Co., Inc., Rochester, N. Y. has separate feed for each tool. Either steel or brass pieces can be produced with equal efficiency on the same machine. Ten threads, can be cut on brass work at the rate of sixty pieces per minute. A wide range of spindle speeds adapts the machine for the most efficient cutting speed for any class of work.

There are five turret tools and four cross slide tools, each having its own independent movement. A fifth cross slide can be added, if desired.

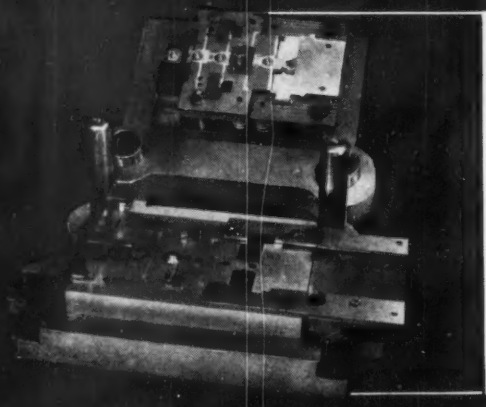
All operations are perfomed simultaneously, and the actual time for a

more than 8,000,000 parts



they built the die in a

DANLY PRECISION DIE SET

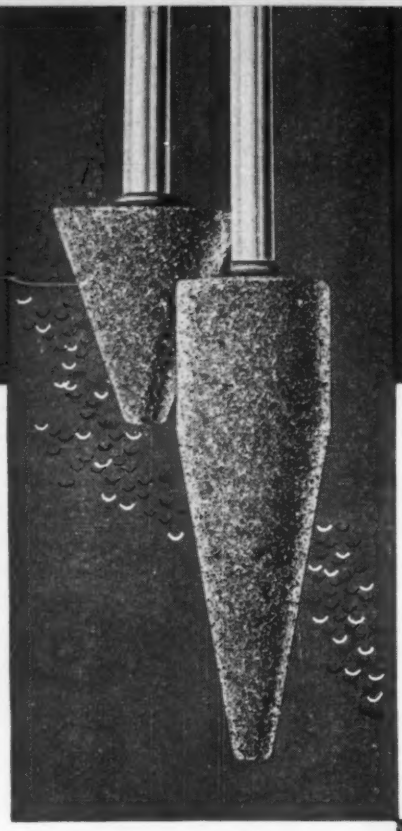


Danly precision makes every Danly Die Set a reliable base for the finest die work. Time is saved in the die shop because Danly Die Sets are square and true . . . they assure longer production runs in the press because precision closure protects die parts. Standard Danly Die Sets are quickly available from a nationwide system of completely stocked assembly branches.* Just phone for fast delivery, and for the finest in die set precision, always specify Danly.

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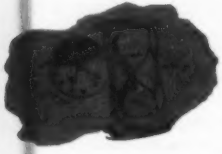


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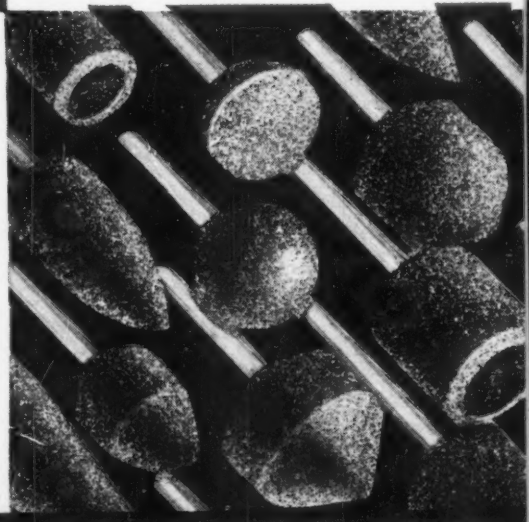
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Chicago Wheel is geared to give you the *fastest possible service*. For *better quality*, too, it will pay you to ***look to Chicago Wheel!***



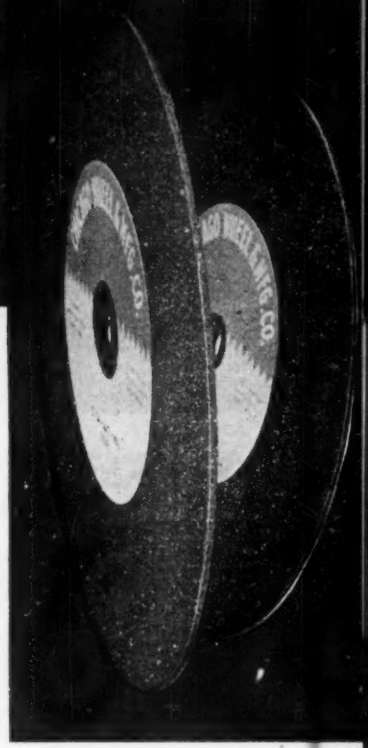
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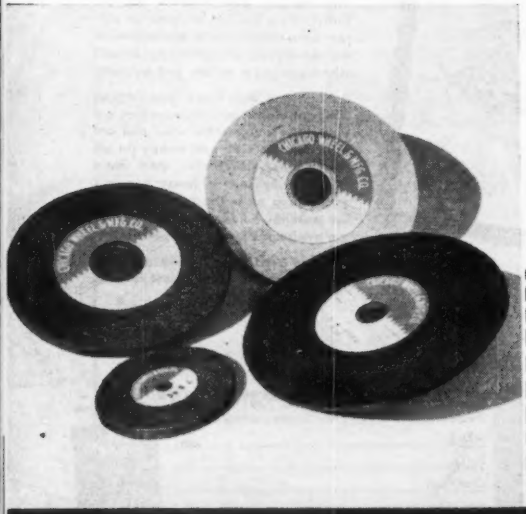
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SPECIAL AUTOMATIC SCREW MACHINE PRODUCTS ELYRIA, OHIO
310 CLARK STREET

Balas Collet Mfg. Company
1557 East 27th Street
Cleveland 14, Ohio.

Attn: Mr. John R. Cox - General Mgr.

Gentlemen:

During the past 18 months, we have been using a considerable amount of your heavy duty stock feed pushers of the squirrel cage type, and we are glad to tell you that we feel that we have had exceptionally good results from this type of pusher.

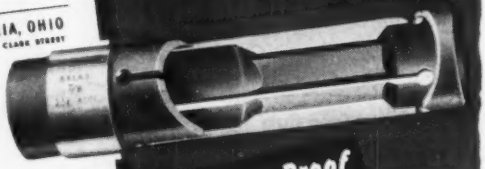
We show several instances of having been able to use this type of pusher in continuous production for a period of six months, and the minimum life we have encountered was approximately four months. This combined with the fact that we have had very little trouble with the pusher marking bars means that it has helped us to secure maximum production from machines.

Yours very truly,

OHIO SCREW PRODUCTS, INC.

N. A. Hewitt - General Mgr.

NAH:JS



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How You, too, Can Eliminate Down-Time and Do Better Work...

Believe it or not...this is not an unusual record for Balas Products! Hundreds of equally well known manufacturers are getting more and better production at far lower costs with Balas Collets, Feed Fingers and "Martin" Master Collets. You, too, can increase the performance of your machines and eliminate "down-time" by specifying "Balas" when you order collets and pushers.

Balas Heavy Duty Cage Type Pushers are superior products because they are made of regular collet steel and are machined to size and shape on all dimensions. This makes them more rugged and results in longer bearings conforming perfectly to the shape of the material. Solder or screw-in types are available for any shape bar stock.

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BALAS COLLET MANUFACTURING CO. 1561 27th Street, Cleveland 14, Ohio
Please send copy of New Balas Catalog and Price List

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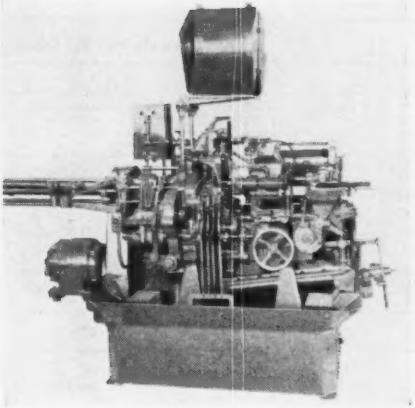
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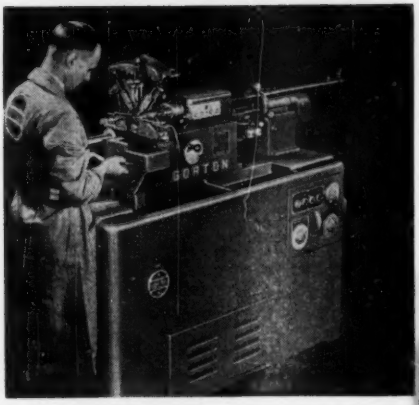
COMPANY _____

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CITY _____ STATE _____







piece of work is the time of the longest operation plus two-fifths second. Sometimes the longest operation can be divided into two or more short operations by doing work on different spindles.

Tolerance as close as .001 or less can be maintained with suitable tool equipment.

George Gorton Swiss Type

In this machine, made by the George Gorton Machine Co., Racine, Wis., the stock bar, gripped by collet in spindle nose, is fed through guide bushing. Tool bits are positioned by cams. Close proximity of tool bits to guide bushing imposes full cutting load on guide bushing. Turned portion of piece is free of total load at all times which permits turning small diameters of long lengths without danger of distortion.

All longitudinal feeds are accomplished by a cam moving the headstock forward as a unit. Retraction of the headstock is controlled by the same cam that moves it forward.

All tool slides are fitted with micrometer screws for adjustment of tools axially and radially. Five tool holders are mounted radially for turning multiple diameters.

Infinite variation in spindle speeds, throughout the entire range from 1100 to 10,000 rpm is provided by variable speed unit.

Part 5. Specifications of American-made Machines

Greenlee Bros. & Co. — **Rockford, Illinois**

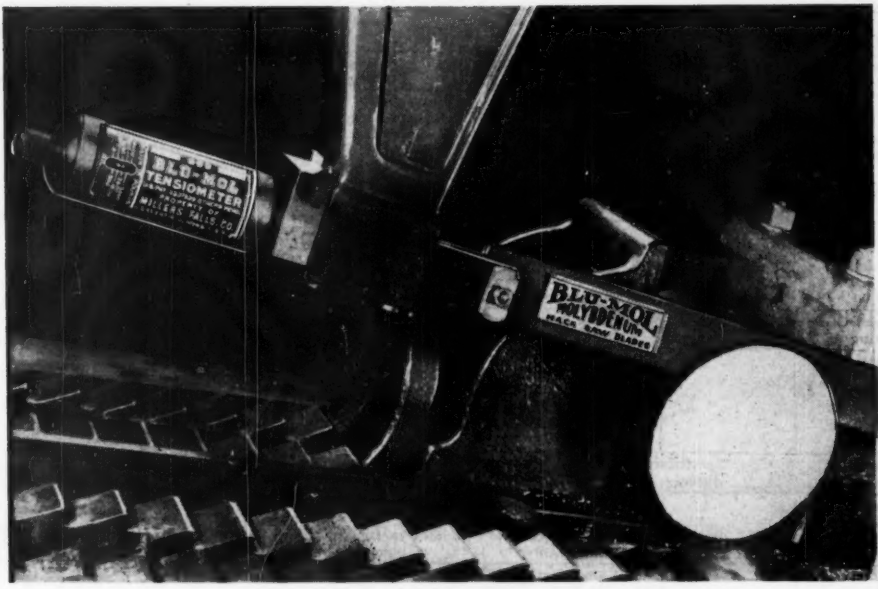
No. Spindles Size and Model	Chuck Capacity R=Round; S=Square H=Hexagon	Stock Feed	Turning Length	Spndle Speeds and Horse Power	Feed Range per Spindle Rev.	Length with Stock Reel
4-Spindles 1⅝ inch	R=1 ⅝"; S=1 ⅜" H=1 13/32"	7⅛"	6"	210 to 2100 15 H. P.	.0016 to .025	17' - 6"
2⅝ inch	R=2 ⅝"; S=1 ⅞"; H=2¼"	8-3/16"	7½"	120 to 1200 20 H. P.	.002 to .0458	17' - 3"
6-Spindles 1 inch	R=1" S=¾"; H=⅞"	6-3/16"	6"	225 to 2500 15 H. P.	.0014 to .0218	17' - 6"
1⅜ inch	R=1⅜"; S=1 ⅛"; H=1 13/32"	8-5/16"	7½"	105 to 2175 20 H. P.	.0017 to .0388	17' - 3"
2 inch	R=2"; S=1 7/16"; H=1 ¾"	8-5/16"	7½"	95 to 1935 25 H. P.	.0019 to .043	17' - 3"

The National Acme Co. — Cleveland 8, Ohio

No. Spindles Size and Model	Chuck Capacity R=Round; S=Square; H=Hexagon	Stock Feed	Turning Length	Spindle Speeds and Horse Power	Length with Stock Reel
Single Spindle 2⅜ inch	R=2⅜"; S=1 27/32"; H=2 17/64"	10"	8"	150 to 1550 25 H. P.	
3½ inch	R=3½"; S=2 15/32"; H=3 1/32"	10"	8"	120 to 1220 25 H. P.	
4¼ inch	R=4¼"; S=3⅜"; H=4⅛"	10"	8"	45 to 800 25 H. P.	
5½ inch	R=5½"; S=3⅞"; H=4¾"	10"	8"	35 to 500 25 H. P.	
4-Spindles 1 inch	R=1"; S=45/64"; H=55/64	5"	5"	289 to 2885 10 H. P.	19' - 2"
1⅛ inch	R=1⅛"; S=1-9/64"; H=1-13/32"	7"	6"	151 to 1806 20 H. P.	17' - 3"
2 inch	R=2"; S=1-7/16"; H=1¾"	7"	6"	151 to 1806 20 H. P.	17' - 3"
2⅜ inch	R=2⅜"; S=1-27/32"; H=2-17/64"	10"	7"	83 to 638 20 H. P.	20' - 1"
3½ inch	R=3½"; S=2-15/32"; H=3½"	9"	8"	56 to 508 25 H. P.	18' - 5"
4¼ inch	R=4¼"; S=3⅜"; H=4⅛"	9"	8"	58 to 394 30 H. P.	18' - 5"
5⅛ inch	R=5⅛"; S=3⅞"; H=4-7/16"	10"	8"	54 to 366 30 H. P.	18' - 8"
7¾ inch	R=7¾"	6"	5"	.14 to 141 30-40 H. P.	20' - 4"
6-Spindles 9/16 inch	R=9/16"; S=25/64"; H=31/64"	5"	5"	289 to 2885 10 H. P.	19' - 2"
1 inch	R=1"; S=45/64"; H=55/64"	5"	5"	239 to 2383 15 H. P.	19' - 2"
1¼ inch	R=1¼"; S=⅞"; H=1 3/32"	7"	6"	302 to 2370 25 H. P.	18' - 3"
1⅜ inch	R=1⅜"; S=1 9/64"; H=1 13/32"	10"	6"	152 to 1640 30 H. P.	20' - 1"
2 inch	R=2"; S=1-7/16"; H=1 ¾"	10"	7"	152 to 1640 30 H. P.	20' - 1"
2⅜ inch	R=2⅜"; S=1 27/32" H=2 17/64"	9"	8"	101 to 1065 40 H. P.	20' - 7"
3½ inch	R=3½"; S=2 15/32"; H=3 1/32"	9"	8"	82 to 471 40 H. P.	18' - 8"
4 inch	R=4"; S=2-13/16"; H=3 7/16"	9"	8"	59 to 425 40-50 H. P.	18' - 8"
8-Spindles 1⅜ inch	R=1⅜"; S=1 9/64"; H=1 13/32"	10"	10"	163 to 1478 40 H. P.	20' - 8"
2⅜ inch	R=2⅜"; S=1-27/32"; H=2 17/64"	8"	8"	101 to 1160 40 H. P.	20' - 7"

The Warner & Swasey Co. — Cleveland, Ohio

No. Spindles Size and Model	Chuck Capacity R=Round; S=Square H=Hexagon	Stock Feed	Turning Length	Spindle Speeds and Horse Power	Length with Stock Reel
5-Spindles 1¼ inch Model M-2500 standard	R=1¼"; S=1¼"; H=1½"	10"	10"	130 to 1414 RPM 15 H. P.	19' - 0"
1¼ inch Model M-2530 oversize capacity	R=2¼"; S=1-9/16"; H=1-15/16"	10"	10"	130 to 1414 RPM 15 H. P.	19' - 0"



This Team is Unbeatable

for cutting your power hacksawing costs

With just Millers Falls "Blu-Mol"® blade by itself, you can expect spectacular performance. An exclusive Millers Falls heat treatment gives a hard, abrasion resistant edge that guarantees more cutting per blade than any other blade of its type.

Use it with the Millers Falls patented "Blu-Mol" "Tensiometer"® — the only device made that maintains constant blade tension at all times while saw is in operation — and you have a cutting combination that just can't be beat for all-purpose sawing.

No matter what kind of blade you are now using, a single trial will convince you that these are no wild claims. In test after test the "Blu-Mol" blades and "Blu-Mol" "Tensiometer" have proved their ability with eye-opening performance.

Write today for full details on this unique hacksawing combination. Or, better yet, let us arrange for a free demonstration on your own work, in your own machines.

MILLERS FALLS TOOLS
SINCE 1868

MILLERS FALLS COMPANY GREENFIELD MASS.

HAND BLADE MAGIC

Bend and twist a Millers Falls "Blu-Flex"® blade as shown at left. Then straighten and put it in a frame. You'll be amazed at the punishment this remarkable new blade can take without losing its outstanding cutting qualities. Try "Blu-Flex" for lowest cost, high speed hand hacksawing.

Brown & Sharpe Mfg. Co. — Providence 1, R. I.

Type - Size and Model	Capacity	Feed Length	Turning Length	Spindle Speeds and Horse Power	Machine Size
Single Spindle Model OOG	⅛" dia.	1" with 240 RPM 2" with 120 RPM Greater length fed by successive movements.	Turret slide permits turning any length to ¾". Distance, face of collet to turret 2-15/16", max. 1⅞" min.	50 to 6050 3 H. P.	66"x36"x60"
Model OOG cutting off	Specifications same as above. No turret, Stop holder slide has movement of 1¼". Greatest distance, face of collet to front of stop holder on stop slide, 10"; least, 1¾".				
Model OG	⅜" dia.	2" with 180 RPM 3" with 120 RPM Greater length fed by successive movements.	Turret slide permits turning any length to 1¼". Greatest distance, face of collet to turret 5⅛" max.; 2½" min.	35 to 4230 5 H. P.	78"x41"x62"
Model OG cutting off	Specifications same as above. No turret. Stop holder slide has movement of 2". Greatest distance, face of collet to front of stop holder on stop holder slide, 12"; least 2".				
Model 2G	1" or 1½" dia.	2" with 240 RPM 4" with 120 RPM Greater lengths fed by successive movements.	Turret slide permits turning any length to 2". Greatest distance, face of collet to turret 6¾" max.; 3 min.	25 to 3025 for 1" cap. 25 to 2180 for 1½" cap. 5 H. P. for 1" 7-1/2 H.P. for 1-1/2"	84"x43"x65"
Model 2G cutting off	Specifications same as above. No turret. Stop holder slide has movement of 3". Greatest distance, face of collet to front of stop holder on stop holder side, 16", least 2½".				
Auto. Screw Threading	⅛" dia.	Feeds any length to 1" greater by successive movements.	Threads any length to 1". Greatest distance, front of chuck to face of die, 2⅞"; least ⅛".	454 to 5000 2 H. P.	65"x37"x60"
Auto. Pinion Turning Machine	¼" dia.	Feeds any length to 1" with 240 RPM, 2" with 120 RPM, greater lengths fed by successive movements.	Movement of turret carrier arm slide permits turning any length to 2⅞".	910 to 10,000 2 H. P.	65"x37"x60"

Standard Machinery Co. — Providence, R.I.

Spindle - Size and Model	Chuck Capacity R=Round; S=Square H=Hexagon	Stock Feed Stroke	Spindle Speeds Horse Power	Machine Size
Single Spindle Floor Model	R=1"; S=¼"; H=⅞"	4" max.	225 to 3,000 3 H. P.	48" x 30.5" x 71"
Bench Model	R=1"; S=¼"; H=⅞"	4" max.	225 to 3,000 3 H. P.	37" x 19" x 39.5"

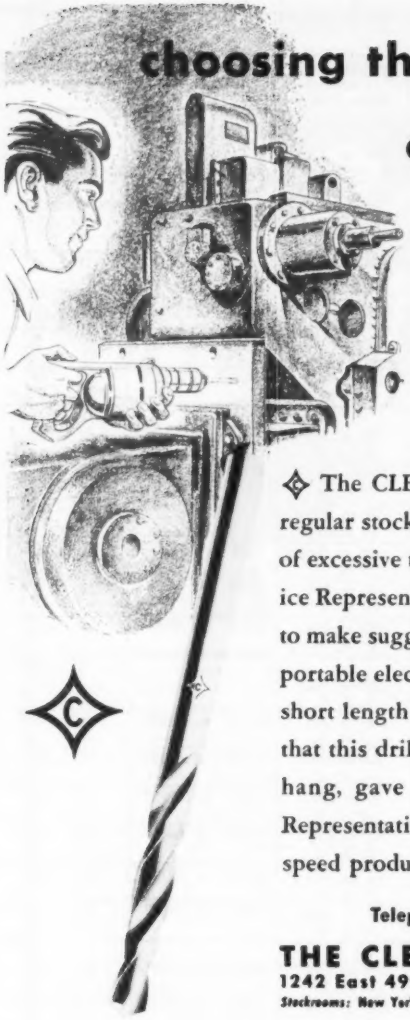
George Gorton Machine Co. — Racine, Wis.

Type - Size and Model	Chuck Capacity	Turning Length	Spindle Speeds and Horse Power	Machine Size
Swiss-type 7/16 inch	7/16"	1¾" flat cam 2¾" bell cam	1,100 to 10,000 2 and 1-1/3 H. P. Spindle Motor	60" x 32" x 13 ft. bar feed

Davenport Machine Tool Co. — Rochester, N. Y.

No. Spindles Size and Model	Chuck Capacity R=Round; S=Square; H=Hexagon	Feed Length	Turning Length	Spindle Speeds and Horse Power	Machine Size with Bar Feed
5-Spindles Model B	R=9/16"; S=⅜"; H=½"	3"	2⅝"	750 to 3000 7½ H. P.	14' - 8"

choosing the right stock drill cuts tool cost 33%



Test Shows This Drill Gives *Best Performance*

The CLE-FORGE High Speed Drill shown here is a regular stock item . . . yet it successfully solved a problem of excessive tool breakage. Recently a *Cleveland* Service Representative was called into a large automotive plant to make suggestions on the proper types of drills for use in portable electric drills. He recommended a switch to the short length CLE-FORGE High Speed Drill. Tests proved that this drill, because of its heavier web and small overhang, gave *33% longer life.* A *Cleveland* Service Representative may be able to help *you* cut tool costs and speed production. Contact our nearest Stockroom, or . . .

Telephone Your Industrial Supply Distributor

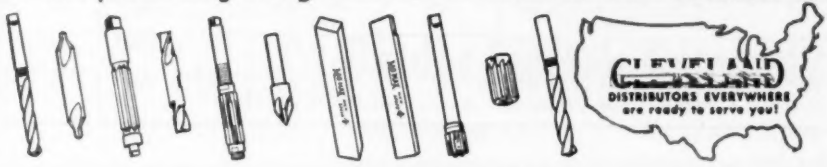
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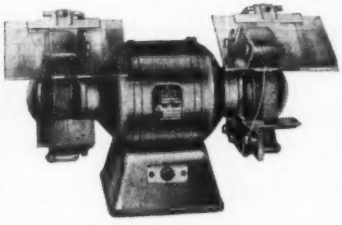
Cone Automatic Machine Co. — Windsor, Vt.

No. Spindles Size and Model	Chuck Capacity R=Round; S=Square; H=Hexagon	Stock Feed	Spindle Speeds and Horse Power	Feed Range per Spindle Rev.	Machine Length with Stock Reel
Multi-Single					
4-Spindles					
1⅜"	1⅜"	8½"	100 to 2141 20 to 30 H.P.		20' - 0"
4-Spindles					
Vertical					
1"	R=1"; S=45/64"; H=55/64"	12"	180 to 1843	.0025" to .0147"	17' - 7"
1¼"	R=1¼"; S=51/64"; H=1-5/16"	12"	180 to 1843	.0025" to .0147"	17' - 7"
1½"	R=1½"; S=1-1/16"; H=1-19/64"	12"	180 to 1843	.0025" to .0147"	17' - 7"
2¼"	R=2¼"; S=1-19/32"; H=1-61/64"	12"	104 to 632	.0026" to .0102"	20' - 10"
2⅜"	R=2⅜"; S=1-55/64"; H=2-9/32"	12"	104 to 632	.0026" to .0102"	20' - 10"
4-Spindles					
⅞"	R=⅞"; S=⅜"; H=¾"	5"	326 to 2940 10 H. P.	.0022" to .0108"	15' - 7"
1¼"	R=1¼"; S=51/64"; H=1-5/64"	9"	150 to 1700 10 H. P.	.0031" to .0156"	17' - 9"
1½"	R=1½"; S=1-1/16"; H=1-19/64"	9"	150 to 1700 10 H. P.	.0031" to .0156"	17' - 9"
2"	R=2"; S=1-27/64"; H=1-47/64"	9"	106 to 840 15 H. P.	.0038" to .0182"	20' - 11"
2¼"	R=2¼"; S=1-19/32"; H=1-61/64"	11"	108 to 859 20 H. P.	.0029" to .0140"	20' - 6½"
2⅜"	R=2⅜"; S=1-55/64"; H=2-9/32"	11"	108 to 859 20 H. P.	.0029" to .0140"	20' - 6½"
6-Spindles					
1"	R=1"	6"	220 to 3027 20 to 25 H. P.		18' - 6"
1¼"	R=1¼"; S=51/64"; H=1-5/64"	8½"	205 to 2053 15 H. P.	.0018" to .0730"	21' - 9"
1½"	R=1½"; S=1-1/16"; H=1-19/64"	8½"	205 to 2053 15 H. P.	.0018" to .0730"	21' - 9"
2"	R=2"; S=1-27/64"; H=1-47/64"	9"	85 to 1055 20 H. P.	.0007" to .0295"	22' - 6"
2¼"	R=2¼"; S=1-19/32"; H=1-61/64"	12"	92 to 619 30 H. P.	.0015" to .0635"	22' - 6"
2⅜"	R=2⅜"; S=1-55/64"; H=2-9/32"	12"	92 to 619 30 H. P.	.0015" to .0635"	22' - 6"
3½"	R=3½"; S=2-15/32"; H=3-1/32"	8"	73 to 466 30 H. P.	.0012" to .0490"	21' - 4"
8-Spindles					
1¼"	R=1¼"; S=51/64"; H=1-5/64"	6"	174 to 1360 20 H. P.	.0010" to .0390"	21' - 6"
1½"	R=1½"; S=1-1/16"; H=1-19/64"	6"	174 to 1360 20 H. P.	.0010" to .0390"	21' - 6"
1⅜"	R=1⅜"; S=1-5/32"; H=1-13/32"	6"	150 to 1171 20 H.P.	.0013" to .0512"	21' - 6"
1⅞"	R=1⅞"; S=1-21/64" H=1⅜"	6"	105 to 498 25 H. P.	.0017" to .0670"	21' - 6"
2¼"	R=2¼"; S=1-19/32"; H=1-61/64"	8"	75 to 651 30 H. P.	.0021" to .0400"	26' - 4"
2⅜"	R=2⅜"; S=1-55/64"; H=2-9/32	8"	75 to 651 40 H. P.	.0021" to .0400"	26' - 4"

For small tools or light production work, read here about the 1/3 h.p.

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UTILITY GRINDER 6110



One of the outstanding features of all Baldor Grinders is the near-perfect balance of their armatures and wheels which provides smooth, vibrationless performance. In addition to the dynamic (electronic) balancing of armatures mentioned above, Baldor buys only first-grade (the very best) wheels and then brings them closer to perfect balance by the use of patented Baldor Balance Flanges (wheel weights) where necessary. The result is almost no end play at the wheels allowing as close tolerance work as possible on a bench grinder.

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$52.00



Special Reversible Carbide Tool Grinder No. 500

$131.40

Baldor Electric Company

Grinders ● *Motors* ● *Battery Chargers*

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The Cleveland Automatic Machine Co. — Cincinnati 12, Ohio

No. Spindles Size and Model	Chuck Capacity R=Round; S=Square; H=Hexagon	Stock Feed	Turning Length	Spindle Speeds and Horse Power	Length with Stock Reel
Single-Spindle 2½ inch Model AB	R=2½"; S=1¾"; H=2 5/32"	10½"	6"	24 to 1820 RPM 5 and 10 H. P.	18' - 5"
3 inch Model AB	R=3"; S=2 ⅛"; H=2 19/32"	10½"	6"	24 to 1402 RPM 5 and 10 H. P.	18' - 5"
1-1/16 inch Model A	R=1 1/16"; S=¾"; H=⅞"	6½"	3¾"	144 to 1560 RPM 1 and 2 H. P.	13' - 3"
1⅜ inch Model A	R=1 ⅜"; S=31/32"; H=1 3/16"	9"	4¼"	98 to 888 RPM 2 H. P.	16' - 5"
2½ inch Model A	R=2½"; S=1 ¾"; H=2-5/32"	10½"	6"	42 to 548 RPM 5 H. P.	18' - 5"
2½ inch Model A	R=2½"; S=1 ¾"; H=2 5/32"	10½"	6"	78 to 1010 RPM 5 H. P.	18' - 5"
3¾ inch Model A	R=3¾"; S=2-21/32"; H=3¼"	14"	7⅞"	28 to 732 RPM 15 H. P.	13' - 5" machne length
5¾ inch Model A	R=5¾"; S=4"; H=5"	12½"	9"	33 to 480 RPM 15 H. P.	15' - 7" machine length
8 inch Model A	R=8"; S=5 ⅞"; H=6 ⅞"	13"	9"	25 to 293 RPM 20 H. P.	17' - 8" machine length
9½ inch Model A	R=9½"; S=5 ⅞"; H=6 ⅞"	13"	9"	22 to 115 RPM 20 H. P.	17' - 8" machine length
1-1/16 inch Model B	R=1 1/16"; S=¾"; H=⅞"	8¼"	6¼"	249 to 1027 RPM 3 H. P.	11' - 7'
1½ inch Model B	R=1 ⅜"; S=1 ⅛"; H=1 13/32"	10¼"	6"	82 to 1506 RPM 7½ H. P.	15' - 9"
2½ inch Model B	H=2½"; S=1 ¾"; H=2 5/32"	10¼"	6"	68 to 1265 RPM 7½ H. P.	15' - 9"
3¾ inch Model B	R=3 ¾"; S=2 21/32"; H=3¼"	14"	12"	75 to 447 RPM 10 H. P.	13' - 5" machine length
5¾ inch Model B	R=5 ¾"; S=4"; H=5"	12½"	12"	48 to 232 RPM 15 H. P.	15' - 7" machine length
1½ inch Model B 18"	R=1 ⅜"; S=1 ⅛"; H=1 13/32"	19½"	13½"	82 to 1506 RPM 7½ H. P.	19' - 3"
2½ inch Model B 18"	R=2½"; S=1 ¾"; H=2 5/32"	19½"	13½"	68 to 1265 RPM 7½ H. P.	19' - 3"
Double End 1 inch Model J	R=1 5/16"	11" *		110 to 493 RPM infinitely variable	6' - 3" machine length
2 inch Model J	R=2⅜"	14' "		51 to 213 RPM infinitely variable	10' machine length

* Parts Magazine Fed—Dimension is longest piece which can be accommodated.

The H. P. Townsend Mfg. Co. — Hartford, Conn.

No. Spindles Size and Model	Capacity Blank Dies	Length of block	Production per minute	Spindle Speeds and Horse Power	Machine Size
Single Spindle High Speed Shaver	1/16" - 13/16"	3/16" - 3½"	30 to 90 pcs.	1800 RPM - ¾ H.P.	44" x 34" x 62"
Single Spindle Pointers & threaders No. 1	1/16" - 5/32"	1¼" max.	⅛" - No. 2 screw 180 gross per 10 hours		33" x 22"
No. 2	3/32" - 5/16"	3½" max.	¼" - No. 6 screw 63 gross per 10 hours		43" x 26"
No. 3	¼" - 7/16"	6" max.	4" - No. 24 screw 11 gross per 10 hours		46" x 26"

The New Britain Machine Co., New Britain Machine Div. — **New Britain, Conn.**

No. Spindles Model No.	Chuck Capacity R=Round; S=Square H=Hexagon	Stock Feed	Turning Length	Spindle Speeds RPM	Length with Stock Reel
4-Spindles Model 40 1 inch	R=1"; S=11/16"; H=7/8"	5"	4"	326 to 3888	18' - 1"
Model 42 1⅜ inch	R=1⅜"; S=1⅛"; H=1⅜"	6"	6"	165 to 2519	19' - 6"
Model 42 2¼ inch	R=2¼"; S=1-9/16"; H=1-15/16"	6"	6"	109 to 1670	
6-Spindles Model 601 1¼ inch	R=1¼"; S=⅞"; H=1⅛"	6¾"	6"	244 to 2800	26' - 0"
Model 602 2¼ inch	R=2¼"; S=1-19/32"; H=1-15/16"	7"	7"	103 to 2351	21' - 4"
Model 60 1 inch	R=1"; S=11/16"; H=7/8"	5"	4"	320 to 3875	18' - 1"
Model 61 1⅜ inch	R=1⅜"; S=1⅛"; H=1⅜"	6"	6"	178 to 2527	19' - 6"
Model 61 2¼ inch	R=2¼"; S=1-9/16"; H=1-15/16"	6"	6"	118 to 1675	19' - 6"

The Producto Machine Co. — **Bridgepore, Conn.**

No. Spindles Size and Model	Chuck Capacity R=Round; O=Octagon; H=Hexagon	Turning Length	Spindle Speeds and Horse Power	Length with Stock Reel
4-Spindles Form and Cut-off	R=⅜"	6⅜"	875 to 2630 RPM 7½ H. P.	17' - 5"

Johnson Automatic Machine Co. — **Westfield, Mass.**

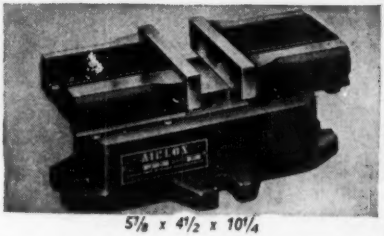
No. Spindles Size and Model	Chuck Capacity R=Round O=Octagon; H=Hexagon	Spindle Speeds and Horse Power	Length with Stock Reel
Single Spindle 1-3/16 inch	R=1-3/16"; O=1⅛"; H=1-1/16"	855 to 1500 RPM 2 H. P.	5' - 0" machine length

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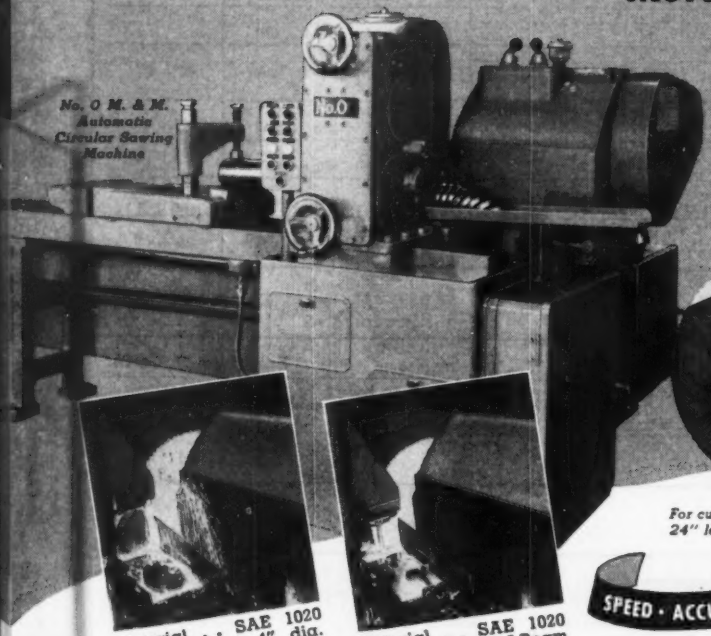


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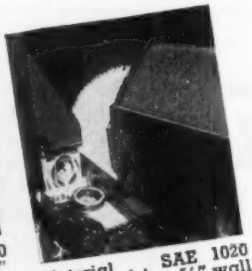
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Material . . SAE 1020
Size . . . . . 1¾" x 3"
Sawing Time . 20 sec.



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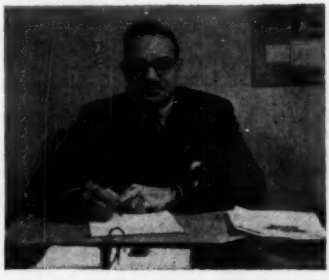
Letter from Great Britain

Boat Building. An interesting development in boat building has taken place on the north-east coast where the hull of a 16 foot dinghy has been moulded from a resin bonded, glass fabric. This new hull weighs only 80 lbs. and is only 1/16 in. thick. The makers say that if made thicker, the hull would be bullet proof. This resin bounded, glass fabric that has been used is said to withstand the effects of weather and a point of particular interest is that it is immune from attack by the Toledo worm which necessitates the copper bottoming of boats used in tropical waters.

Every year the British Association holds a meeting which lasts several days and this year the large industrial centre of Birmingham was chosen as the meeting point. All manner of subjects are discussed at the sessions held and the country's leading scientists attend. Among the subjects discussed this year was productivity in industry and engineers will be interested to know that the potato is blamed for part of the lower productivity in this country. The potato, so listeners were told, was a complete food in itself if taken with a pint of milk daily. The potato is easily grown and for just a few months' work in the year it is possible to provide ample food for a family so that laziness is promoted. During the eighteenth century this food value of potatoes was appreciated when it saved the workers from starvation, but its very cheapness was the undoing of the workers, whose wages and standard of living were kept low by this useful food commodity. Apparently we are still suffering from the effects of this.

It was stressed at the meetings that Britain wanted more and better technologists in industry who could apply existing knowledge to industrial problems. The cause of pure science is well served and Britain is well to the fore in research work, but it is the translation of the results of this research work into something more tangible that is Britain's urgent need today. Sir Ewart Smith, technical director of the giant Imperial Chemical Industries, said that Britain's industrial productivity needs to increase by at least 5 per cent per year for a good many years to come. This increase could come only from the training of technicians and not from sheer physical force of the workers and both he and Sir Henry Tizard, who is chairman of the Government Advisory Committee on Scientific Policy, called for better training facilities for technicians.

Wage Increases. During the first seven months of the year 1950, about 2,597,000 shared between them wage increases



Written for the MACHINE and TOOL BLUE BOOK by Robert Hutcheson, editor of MACHINE SHOP MAGAZINE, London, England.



which amounted to £469,500 ($1,400,000) per week. In the corresponding period of 1949 4,440,500 workers had an increase of about $2,260,000. Workers in the metal trades were among those who benefited by these increases. In spite of labour shortages in some branches of industry and in some businesses, the working population of this country rose last year by about 133,000, nearly all of whom were women. One serious aspect of this is a drastic fall in the number employed in the coal mining industry, upon which so much in Britain is dependent. During the first seven months of this year there were 838 industrial disputes which involved a loss over the period of 837,000 working days.

The Rover Company built the world's first automobile to be driven by a gas turbine and they have now received an order from the Admiralty for a number of their gas turbines which it is anticipated will be used experimentally in small launches. The Admiralty is thus maintaining the lead which they took some three years ago when a sea-going warship was fitted out with a gas turbine unit for the first time. Gas turbines for warships are regarded by the Admiralty as a long term policy, but for small-

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er vessels this is not the case and the experiment about to be conducted will be concerned mainly with the ease with which this new type of engine can be maintained. Maintenance is expected to be easy and various grades of oil can be used for one engine.

Machine Tools for Export. Last month I mentioned that Craven Brothers were concerned about some of the machine tools that they were building for export and since then this matter has been discussed in Parliament. The latest news is that several heavy machines will not now be sent to Russia and Poland by Craven Brothers as the Government has withdrawn certain of the firm's export licenses. These machines will be diverted to other users in this country but the firm still has orders for heavy plant including centre lathes and planing machines which they would like to see treated in a similar way.

Machine Tests Drills. An interesting new machine has been built by Adcock and Shipley Ltd. of Leicester, for testing drills up to 3 ins. diameter. The machine is of a portal construction having a table bridged by a drilling head which is integral with two side columns. This



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Made of finest high-speed steel in standard and special sizes from ⅛" to 1¼" body diameter.

Full information is contained in Circle R's Catalog M, available on request.



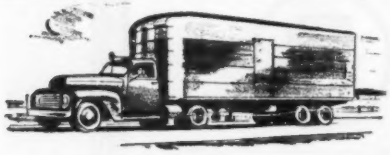
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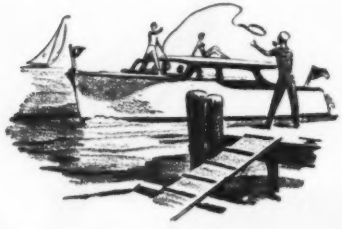
How Production-Wise Manufacturers

SAVE SANDING COSTS



ON LAND

The gleaming stainless steel that makes up these modern truck trailer bodies is polished with BONDITE* Jewelox paper belts. Because they cut faster, last longer, Jewel Abrasive Belts can roll up sanding savings for you!



ON THE SEA

Torn covers on drum sanders were causing costly slow-downs in finishing plywood sheets for this boat builder. AP Sales Engineer recommended change to super-tough Jewel Bondex Garnet Fibre. Builder reports, "These Jewel drum covers are the best ever!

Moisture repellent and heat resistant.

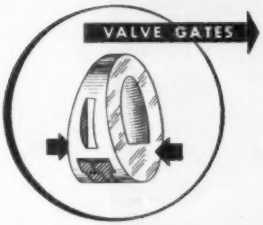
Whatever your product, chances are you can cut costs — do better work like this — with Jewel Coated Abrasives. See your distributor or write us now!

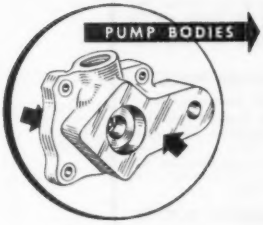
Abrasive Products, Inc.

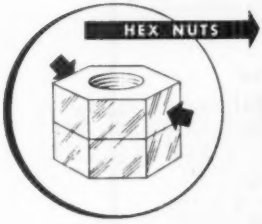
SOUTH BRAINTREE 85, MASSACHUSETTS • MAKERS OF JEWEL COATED ABRASIVES

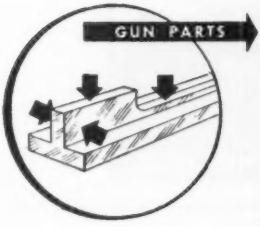
portal or arch construction enables the machine to withstand heavy stresses with a minimum of deflection. The spindle is driven by a vertical 40 h.p. motor which drives through pick off gears so that 269 spindle speeds are available. The feed to the spindle drill is given by a 2 h.p. motor which drives through a worm reduction gear and on epicyclic production gear which, with pick off gears gives feeds ranging between ¾ and 60 ins. per minute. Slipping clutches are provided to protect the feed mechanism on both the input and output sides because heavy stresses are set up very quickly as soon as a drill is destroyed completely. Power consumption for both the spindle drive and the feed is measured separately by two ammeters so that a measure of torque and thrust is always available while tachometers indicate the spindle speed in r.p.m. and the feed in inches per minute so that variations in these rates are always available.

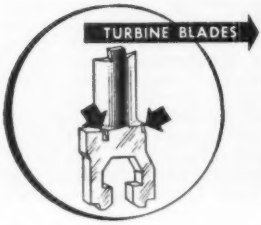
Nationalising Steel. The Parliamentary action to nationalise the steel works took place unexpectedly this month, and with a very slender majority the Government was able to pass its measure for the immediate operation of the Steel Nationalisation Act. The way of nationalised steel

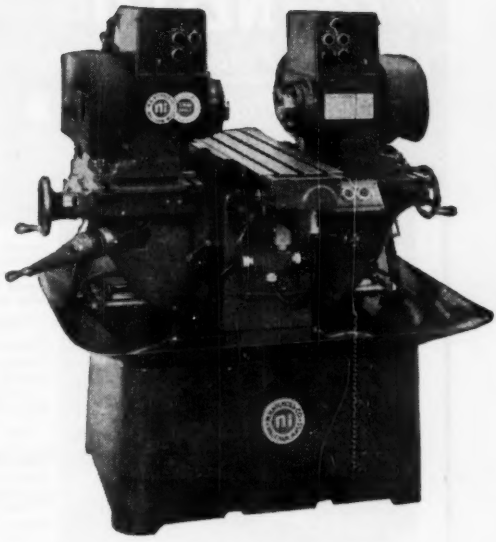












on the NEW *Nichols* TWIN MILL

The TWIN MILL cuts milling costs in half on many jobs. It handles **TWO** milling operations at a time, yet requires but **ONE** fixture and **ONE** operator. Designed for the class of work usually assigned to Hand Millers or light Automatic Production Millers, the Twin Mill's speed, accuracy, and exceptional flexibility add up to increased output at lower cost. **New** Spindle Retraction automatically withdraws cutters at the end of each cutting stroke. **New** Spindle Brakes act instantly after cycle is completed. The Two Milling Heads are independent units with individual motor drives, quickly adjusted UP or DOWN, IN or OUT, or OFF-SET longitudinally. Machine handles short run or long run work economically. Automatic table cycle and entire machine push-button controlled. Write for details.

CONDENSED SPECIFICATIONS

Table, working surface	8½"x 30"
Table, travel—cutting stroke	11¾"
Motors	(two) 1 HP
Maximum height center of spindle above table	11¾"
Maximum offset of spindles (horizontal)	8½"
Maximum distance between spindle noses (across table)	16"
Floor space required	64"x56"
Spindle Speeds (15)	from 55 to 2050 R.P.M.

Manufactured by W. H. Nichols Co., 48-G Woerd Ave., Waltham 54, Mass.

Have you seen the new Nichols' movie, "The Miller That Uses Its Head"? It's available for showing in your plant.

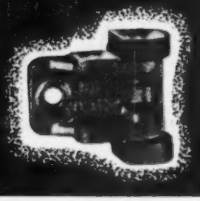
Also available are NICHOLS Hand Millers, NICHOLS two-spindle millers with identical or opposed spindles, and with or without pneumatic feed.

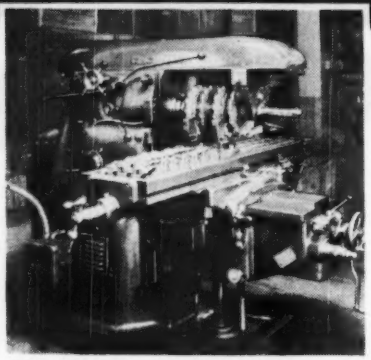
Please address inquiries to

NICHOLS-MORRIS CORPORATION 50-G CHURCH ST. NEW YORK 7, N.Y.

Dealers in Principal Cities

Here's how **NELCO** Carbide Tipped Tools increased Production on this Chilled Iron Casting OVER 60%!





Facing 4 surfaces of Chilled Iron Refrigerator Door Hinge on #3 Cincinnati milling machine — High Speed Steel Cutter vs. Nelco Carbide Cutter.

HIGH SPEED STEEL

Production — 50 pieces per hour.
Cutters needed frequent repairs.
Down-time increased production cost.
Rejected pieces were excessive due to chilled condition and hard spots in castings.

NELCO CARBIDE CUTTER

Production — 80 pieces per hour.
Resulted in continuous operating time and no rejected pieces.
Production increased more than 60%!

OBJECT: SAVINGS — When you change to Carbide Tipped Tools!

Chilled Iron, Steel, Brass, Bronze, Aluminum, or Alloys can be milled faster, better, more efficiently with Carbide Tipped Tools. There is a NELCO Cutter, Face Mill, Slab Mill to increase your production.

Remember: NELCO Tools are designed with nickel shim brazed carbide tips and alloy steel bodies. Investigate the many other NELCO exclusive advantages. Learn how your production costs can come tumbling down.



WRITE FOR CATALOG and name of your NELCO distributor

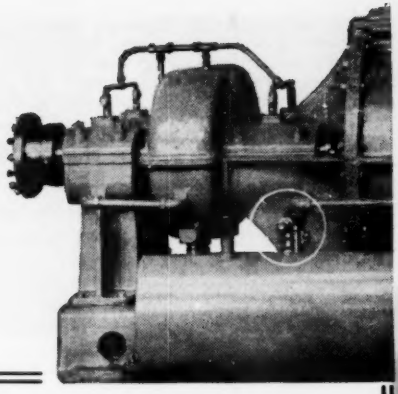
NELCO TOOLS For that Extra Edge in Production

NELCO TOOL CO., INC. MANCHESTER, CONNECTICUT

appears to be even more stony than that of the previously nationalised industries since the leaders of steel making under private enterprise seem unwilling to continue to lead under nationalization. During the war years, and since, the steel industry of Britain has made considerable progress in the supplying of steel for both war time and peace time needs. Whether this progress will continue if the industry cannot retain its present leadership remains to be seen but today very few engineering concerns view with pleasure the rapidly approaching nationalization of the main material of engineering construction.

Industry using coal gas in its processes and lying in the region served by the North Thames Gas Board is suffering from a strike of maintenance workers in gas works stretching from the east coast westward to Windsor with the northern part of London roughly as its centre. About two million industrial and domestic consumers are affected by this strike which has reduced the output of gas so that during peak hours there is prac-

For
BEST PRODUCTION
You Need
BEST EQUIPMENT



that's why

ROOTS-CONNERSVILLE BLOWER CORPORATION
CONNERSVILLE, IND.
installs

OIL-RELIEF FULFLO BY-PASS VALVES

THIS outstanding manufacturer incorporates FULFLO VALVES shown directly above the tank or oil reservoir in the efficient R-C Rotary Positive Gas Pumps. FULFLO VALVES maintain constant, uniform pressures . . . NO MAINTENANCE . . . and they're CHATTERLESS because of the manner in which the cylindrical piston closes off the port.

Pipe sizes: ¼" to 2" standard pipe thread and STD 300 lb.
American flange valves 1" to 1½".

THE FULFLO Specialties Co., Inc.
BLANCHESTER, OHIO

Write TODAY on your letterhead for
FULFLO MECHANICAL DATA BOOK

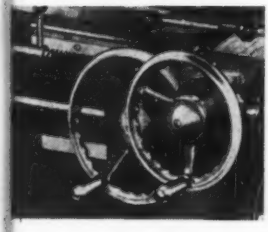
tically none coming through the pipes. Engineering firms using gas, for example, in heat treatment shops and diecasting foundries, are seriously affected for the strike has gone on now for over a fortnight and many of these firms are now standing off their employees. The dispute concerns a demand for a wage increase but is not supported by the engineering unions to which the strikers belong.

HOW WELL DO YOU KNOW YOUR TOOLS?

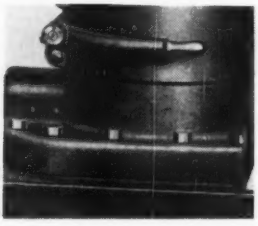
By Herman Reichardt, Consulting Engineer

Below and on the next page are ten photos of machines. Line up the correct number with the list. Count ten points for each correct question. 80-100 . . . Gee! 60-70 . . . good, good; 40-50 . . . hm, could be better; below 40 . . . into the shop for another look. Answers on page 287.

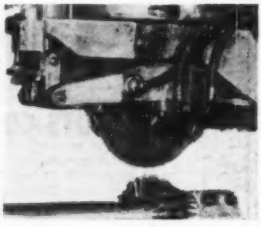
1.



2.



3.



The internal gage that's RIGHT for war production conditions

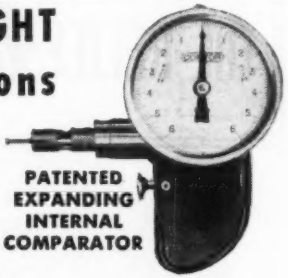
COMTORPLUG

Gages precision bores to fractions of .0001"

War production conditions intensify the need for a gage that gives high precision yet is Rugged, Automatically Accurate, "Unrestricted".

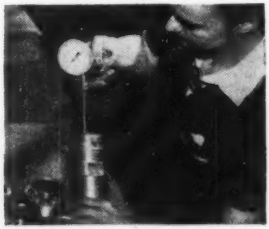
Patented COMTORPLUG answers the need as no other gage can because:

1) Withstands typical shop use at machine or inspection bench, without lessening precision.
2) Trainees equal old hands in precision results, due to automatic alignment and "feel".
3) For Quality Control, gives actual measurement, and a fixed- not passing—reading.
4) Available anywhere instantly. Weighs but a few ounces. No hose, wire, or "10-ton base".
5) Cost is so reasonable as to be practical for all quantity gaging applications. Fits in with other gaging methods. Let it grow as it proves itself—which it WILL!



PATENTED EXPANDING INTERNAL COMPARATOR

⅛" to 8" dia.



Inspection to fractional ten-thousandths of hydramatic airplane propeller distributor valve.

COMTOR CO.

62 Farwell St., Waltham 64, Mass.

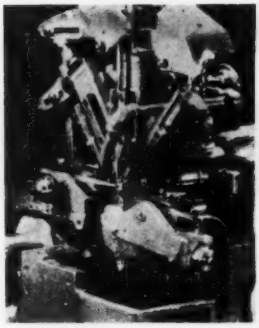
Request "Bulletin 40"



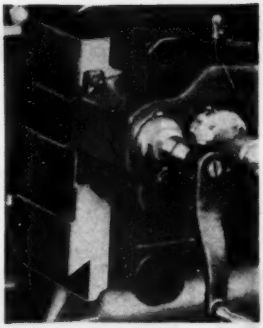
For data on COMTORGAGE Precision External Gage, request Bulletin 30.



4.

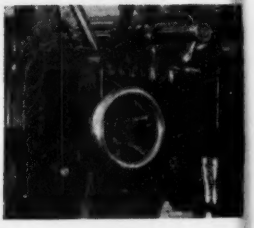


5.



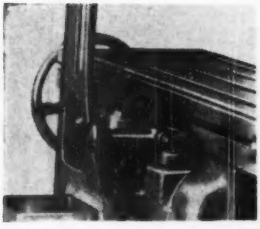
6.

_____ Shaper
_____ Screw Machine
_____ Planer
_____ Radial Drill
_____ Drill
_____ Turret Lathe
_____ Milling Machine
_____ Automatic Lathe
_____ Welder
_____ Contour Projector

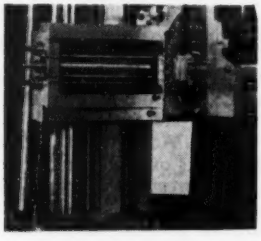


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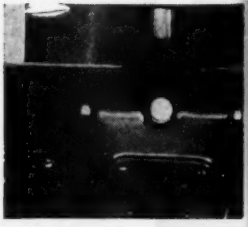
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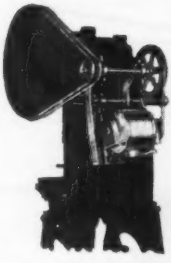


9.



10.





Put the "PUNCH" in Punch Presses with a MODERN Motor Drive

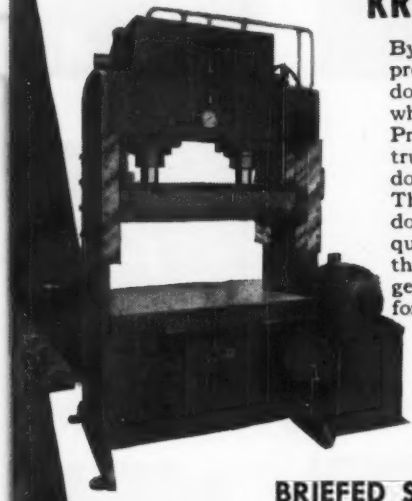
No need to use slow speed or geared motors and small pulleys to slow down your presses.
Utilize standard 1750 RPM motors.
"V" Belt Drive absorbs shock. Operate smoothly, silently, efficiently, economically.

Write to Dept. BB for complete details.

MODERN MOTOR DRIVES DIV. of The Nichols Eng. Co.
Dept. BB, 3818 W. GRAND AVE. CHICAGO 51, ILL.

LONG ON QUALITY SHORT ON PRICE

KRW HYDRAULIC PRESSES



By any standard of comparison, the proven fact is: you pay far less in dollars and get far more in performance when you insist on a KRW Hydraulic Press. The specifications prove it's true, so do performance records, and so do the expert opinions of KRW owners. The price tag tells you one thing—the dollars you save. The unexcelled quality standards tell you another—the dollars you'll make! You should get both when you buy! Write or wire for the full facts and prices!

TWO CYLINDER TYPE

Tons capacity: 60, 85, 100. Platen and bolster, maximum usable size: F to B, R to L, 36″ x 60″. Stroke 6″, 11″. Bed, fixed. Controls: Manual, Semi-Automatic, Fully Automatic for cycled operation.

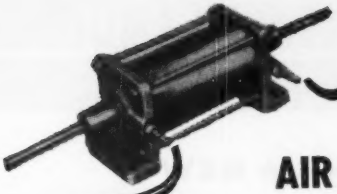
BRIEFED SPECIFICATIONS

KRW presses are self-contained and fabricated of steel for maximum strength, minimum weight, and space conservation. Precision honed cylinders. Adjustable limit switch for top return position of ram. Adjustable tonnage pressure control. Safety by-pass prevents over-loading beyond maximum rated capacity. Large self-contained oil reservoir. Direct connected motor drive to pumps through easily serviced flexible couplings. Safety controls prevent accidents. Long bronze faced gibs adjustable for wear insure accurate travel of slide. Quiet and vibrationless in operation. Presses can be custom built to meet your manufacturing requirements.

Write or wire for full facts and prices.

K. R. WILSON
215 Main Street
Dept. 13 Buffalo 3, N.Y.

K·R·WILSON



READY!

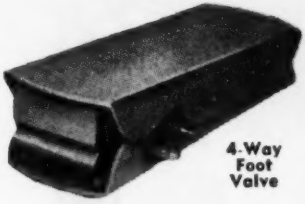
AIR CYLINDERS AND VALVES



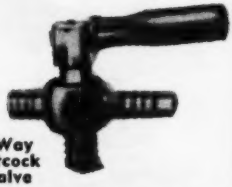
4-Way Bench Valve



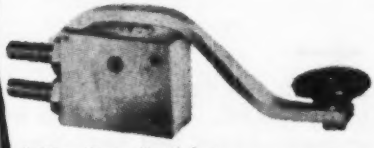
4-Way Cam Valve



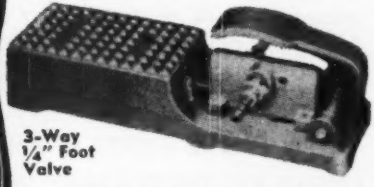
4-Way Foot Valve



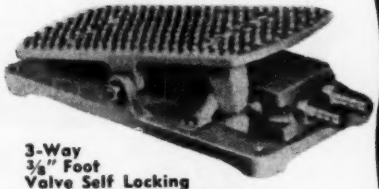
3-Way Petcock Valve



3-Way Fingertip Valve

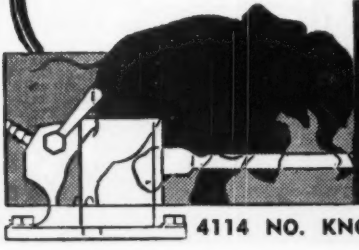


3-Way ¼" Foot Valve



3-Way ⅜" Foot Valve Self Locking and Spring Return

With a valve to suit the job air cylinders can be made to work wonders. Mead Air Valves, Single and Double Acting Air Cylinders, will help you cut costs, speed up work. Write for complete new Catalog of famous Mead air-operated devices!

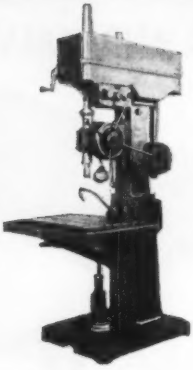


MEAD

SPECIALTIES COMPANY

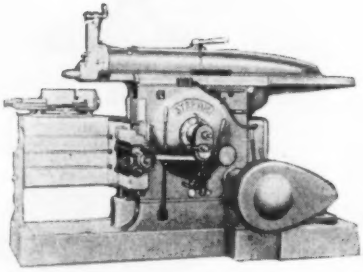
4114 NO. KNOX AVE., DEPT. YA-120, CHICAGO 41, ILL.

Western — THE FAMOUS LINE



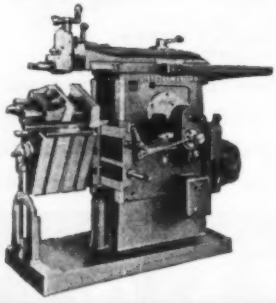
← ★ **NEW**

WESTERN No. 2-12 Upright Drill—Infinite spindle speeds — Sealed ball bearings throughout — 9 geared feeds — Alloy steel gearing — centralized controls — splined spindle—Back geared—1" drill capacity—12" Overhang — 24" Swing — Available with 1, 2, or 3 Heads — Rectangular or round column and table types — Write for Catalog B-4915.



←

STEPTOE SHAPERS—Vee type ram—Centralized controls — Fully Timken bearing equipped—Forced feed lubrication—Multiple disc clutch—Helical bull gear—Involute splined shafts—4 or 8 speeds—7 heavy duty sizes. America's oldest and best shaper. Write for catalog No. B4820.



←★ **NEW** — ***FIRST IN AMERICA***

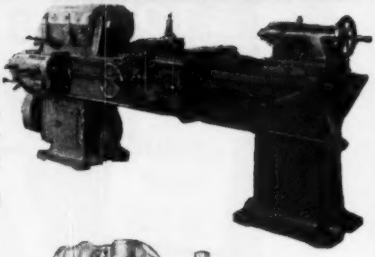
STEPTOE-WESTERN HIGH SPEED SHAPERS Up to **200** Strokes per minute—**4, 9, or 18** all-geared speeds — Vee Type Ram — Timken Bearings Throughout — Forced Feed Lubrication — Helical Bull Gear — Involute Splined Shafts — Universal Table — 10" Heavy Duty Vise — For Medium Duty at Lowest Cost — Available in **12"** and **15"** sizes. Write for Catalogs No. B4820-S and No. B5021.

WESTERN MACHINE TOOL

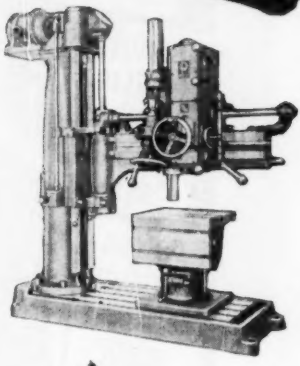
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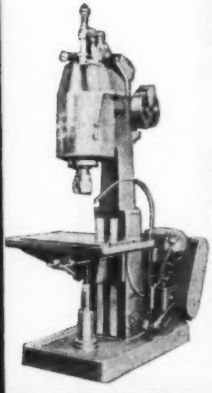


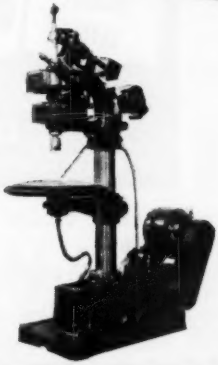
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Mr. Safford was born in Quechee, Vermont on September 27, 1886. After graduating from Dartmouth with the class of '08, Mr. Safford was associated for several years with Jones & Lamson Machine Company, Springfield, Vermont. In 1917 he became co-founder of Lovejoy Tool Company, holding the position of treasurer until 1948 when he became president of the company.

Mr. Safford, a former representative to the Vermont legislature, had also served as chairman of the board of Vermont's Department of Social Welfare, director of the First National Bank of Springfield, vice president of Springfield Hospital, secretary of the Vermont Rose Growers Association, Springfield selectman, trustee of the First Congregational Church and was active in chamber of commerce affairs. Mr. Safford was a member of St. John's Lodge of Masons and Sigma Chi fraternity.

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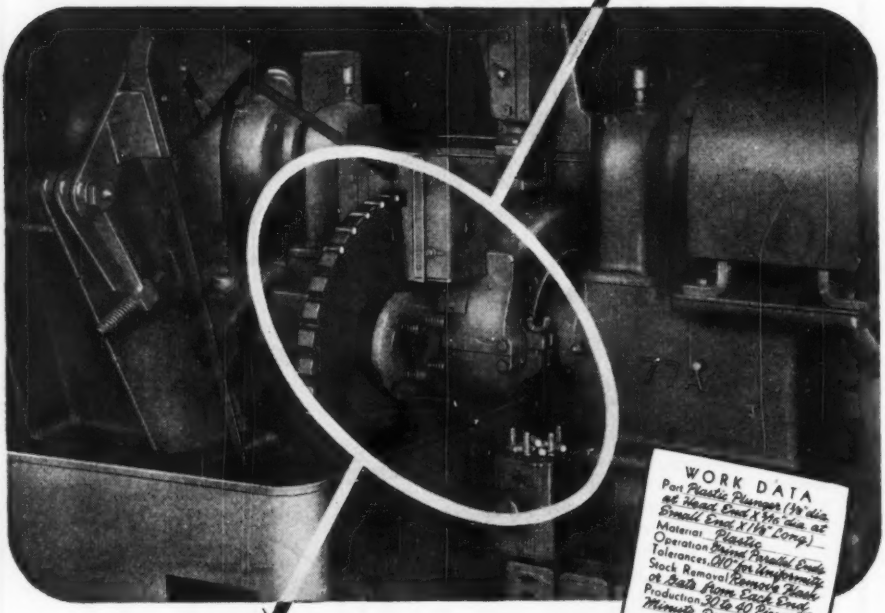
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Foremanship Forum

Problems of Conferences

by Ed. Mottershead

The Selling Conference

The selling conference occurs with two or three variations. Perhaps the most common is a situation where the top executive of a company calls together his subordinates and "sells" them the program or policy he has previously decided upon. The purpose served by this conference is not so much to make sure that the men can understand what is required but that they leave the room feeling that the new program is their own idea. A second variation is a situation where a subordinate is called in to a group of higher executives in order to give them certain specialized information; this affords him a chance to sell this executive group a first hand proposal which he may have in mind. The third common variant of the selling conference is that in which a salesman, having a product to sell, is given the opportunity to present his product or service to a group of the executive of the firm which he is approaching.

Selling by the conference method, from the viewpoint of the outside salesman trying to get an order, has this advantage: even though the members of the group realize that the outsider has a product or service he wishes them to buy, once the meeting gets under way, they become absorbed in a discussion of how and why and ways and means rather than in thinking in terms of the possible objections they can raise to the purchase of this commodity.

In this type of conference the chairman introduces the general subject, and the group members all take part in discussion. After asking a question or two to open the discussion, the chairman or conference leader waits for some response and then asks careful follow-up questions to **lead discussion** the way he wants it to go. This should not be done in any obvious manner, but skillfully so that members of the group do not become aware of any particular bias on the part of the conference leader.

The problem of the conference leader in the selling conference is to open a subject for discussion and guide the discussion and thinking of the group in such a way that, of their own free will, they come to the predetermined conclusion which the conference leader has set for himself for the objective of the conference.

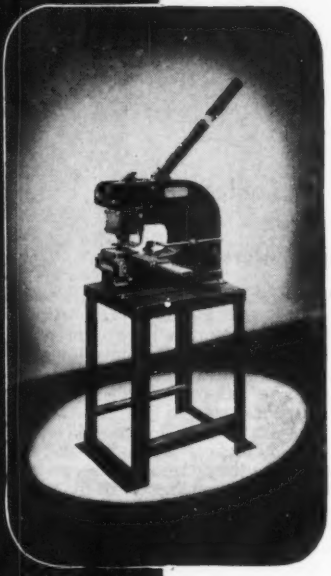
The technique is to open discussion and wait for number of responses; then pick out one of the responses which most nearly follows the line of thought which the conference leader favored, and with a follow-up question to develop that line of thought further. Wait for a few more responses; select the next response which is going in the "right direction" and ask another follow-up question. By repeating this process, you not only allow members of the group to express divergent ideas, and thus avoid any feeling that you are dominating discussion by bottling it up, but at the same time you are drawing from the group the ideas and facts which you want to support your own objective. Avoid, at all costs, establishing any pattern of picking out the response you are going to use as a foothold for a follow-up question. Sometimes that response may be the first that you get to a question. Sometimes it may be the last of several

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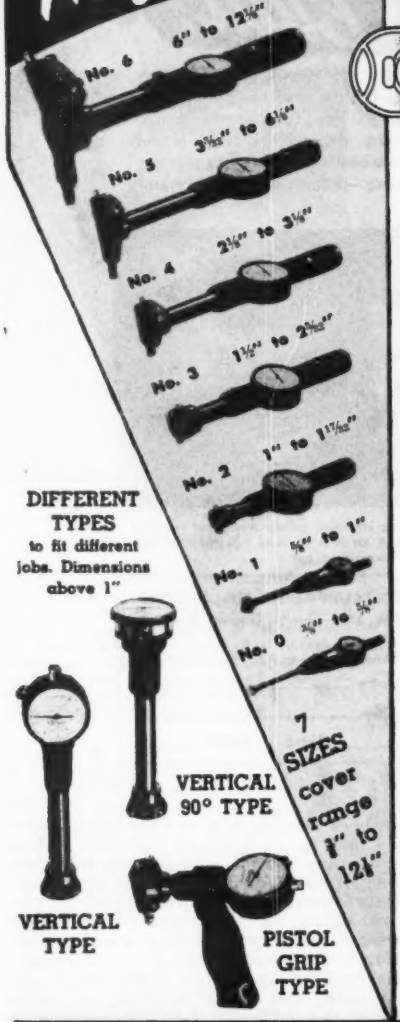
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responses. Try to vary your tactics in such a way that you are not too obvious about the type of response. Even in a selling conference, the group expects that a chairman will be impartial in his attitude and simply serve as a moderator of discussion to assist the group to arrive at a decision in an orderly fashion.

Sometimes it is possible to guide discussion under the guise of keeping order by suggesting that the group is wandering from the subject or by suggesting politely that some too talkative members allow someone else a chance to talk.

The conference leader's preparation for the selling conference is in many ways similar to that of his preparation for the training conference. Likewise, the normal order of events in the conduct of the conference are similar. The chairman will state the subject, the purpose of the meeting, and briefly explain the subject. There may be some definition of terms if it is thought necessary for the complete understanding of what is going on by all members of the group. Similarly, facts and experience and opinions must be drawn from the group and those which

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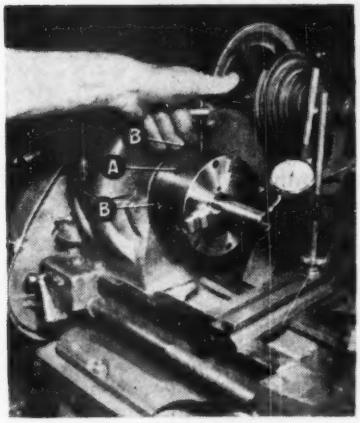
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are most desirable in reaching a solution selected and made a part of the record, either on the blackboard or by the secretary of the group. Through evaluating the facts selected the group is eventually guided to reach a decision.

The chairman summarizes the conference carefully, pointing out exactly what was decided upon, and what the group may expect to result from this conference.

The needs for rules of procedure in this type of conference is limited. Group members should talk ordinarily one at a time and be as brief as possible. Within reason they should control their emotions, especially any display of temper or animosity towards an individual. One element exists in this conference which does not actually exist in a training conference: the power of the group to **decide**. This decision is seldom made by an actual vote, but by a nodding of heads around the table so that the conference leader gets a consensus of opinion in favor of the decision which he has previously set as objective of this conference.

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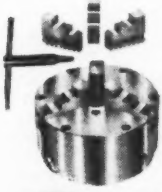
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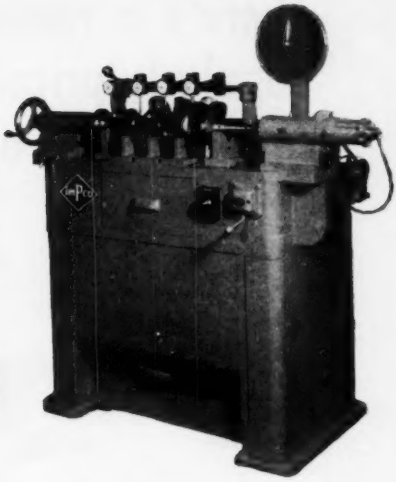
The Problem Solving Conference

One of the primary purposes of the normal business conference is that of solving the problems involved in the conduct of the business. The conference leader, usually a top executive, wishes to secure facts, ideas, and opinions from the group upon which he shall either make a decision, or on the strength of which the group may arrive at a decision which the executive intends to abide by. If such a conference is called; with the real intention of getting ideas from the group, it requires the same careful planning as a training or selling conference.

The chairman introduces the problem to be solved, and usually will first call on individual members to see if the problem is correctly stated and actually includes all of the factors which make up the problem. All members of the group ar expected to speak at will, with a free give and take of questions, facts, ideas, plus the addition of new facts throughout the meeting.

After the chairman has introduced the subject and opened the discussion, he may ask some leading questions of the group to help them break down the problem so that it may be solved step by

The New IMPCO CRANKSHAFT STRAIGHTENER



This machine handles the straightening operation on crankshafts on a high production basis. Straightening is accomplished by pulling downward with hooks which are positioned laterally to line up over the intermediate main journals of the crankshaft. Hooks are actuated by an eccentric shaft below the work surface. Stationary "Vee" anvils are furnished under front and rear journals. Centers are spring loaded and air operation is used for quick loading.

To operate, the crankshaft is laid in the stationary anvils and the centers engaged by hand valve. The indicators are lowered against a stop and the crank is rotated to the point of greatest runout. Indicators are raised to clear, and the hook is then drawn forward over the point of greatest runout. By pressing the "Run" button the hook pulls downward until the button is released. A large dial indicates the amount of deflection being applied to the part.

This method of straightening is as superior to conventional methods in the matter of increased production, as is the use of a multiple spindle drill head compared to the single spindle method. For example, the industry average for straightening a five bearing crankshaft is twenty-two parts per hour. The "Impco" has increased production on such an operation to forty parts per hour.

Construction features of this machine include the use of steel weldments for all structural members, easy accessibility to the moving parts by means of hinged guards and lift-off panels, the generous use of Ampco Bronze for bushings, heat-treated alloy steel gears, and a "one-shot" lubrication system.

The machine is extremely easy to keep clean. Maintenance is negligible as there are no hydraulics, screw threads, or clutches to require attention.

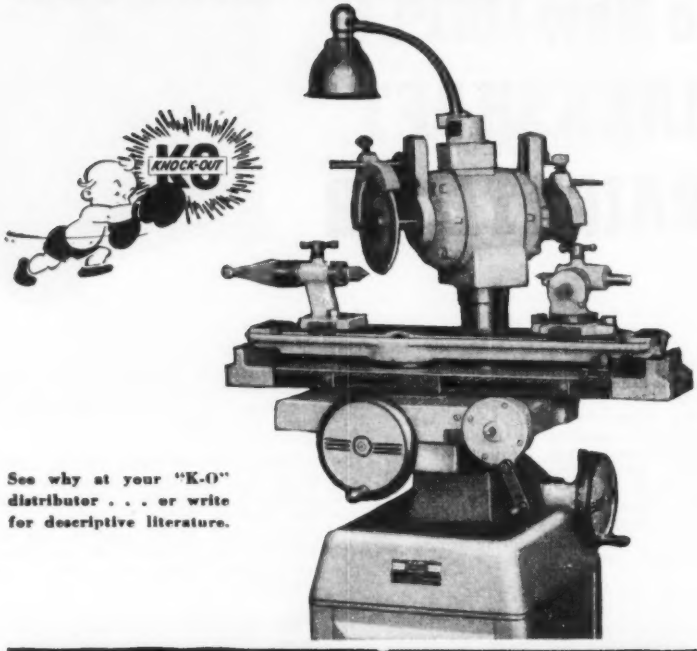
Besides the savings in direct labor on the straightening operation, the machine saves considerable floor space. Because the parts can be straightened to closer tolerances, some manufacturers are making additional savings on grinding operations. Grind allowances can be held to an absolute minimum, thus giving more grinds per wheel dressing.

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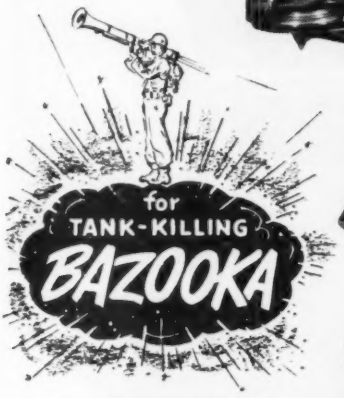
step, or piece by piece if such analysis is practical.

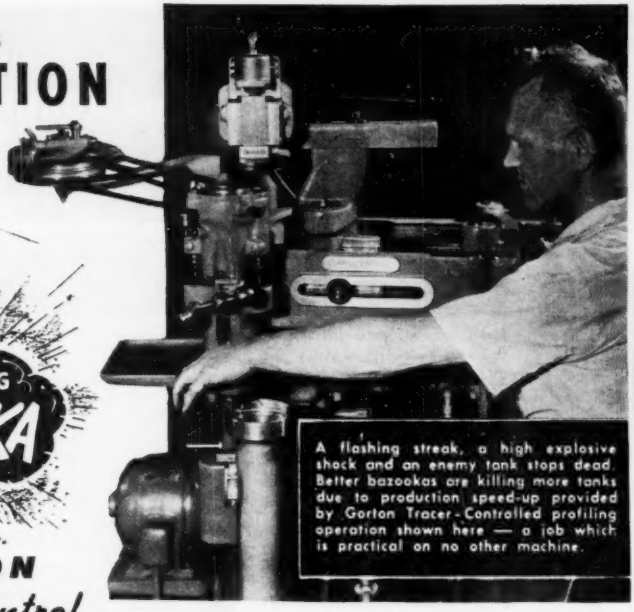
Usually the chairman has a very limited function of keeping order, inasmuch as his main task is to direct the group's attention to the relevant point immediately before them, and to assist them in staying away from blind alleys in the discussion.

Above all, a chairman who honestly has called the meeting with the purpose of getting information from his people, will not urge any final decision upon them, and will definitely not express any viewpoint of his own except as may be necessary should he be called upon to contribute facts or information which he is the only man in the group able to bring into the discussion.

The problem solving conference is similar in basic pattern to the training conference in the chronological order of events which occur during the meeting. By the time facts have been accumulated and selected, and some evaluation of the facts has been made, the skeleton of some

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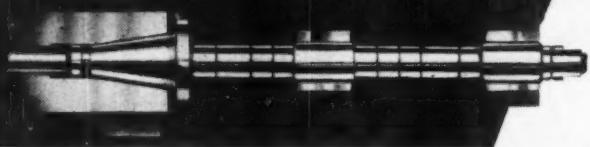
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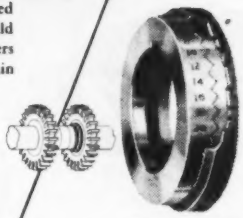
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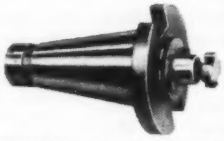
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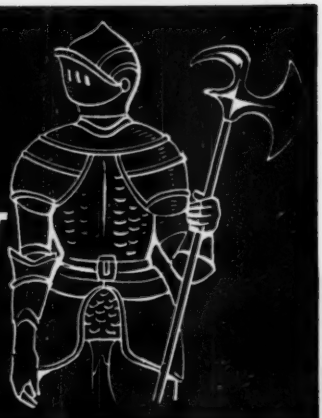
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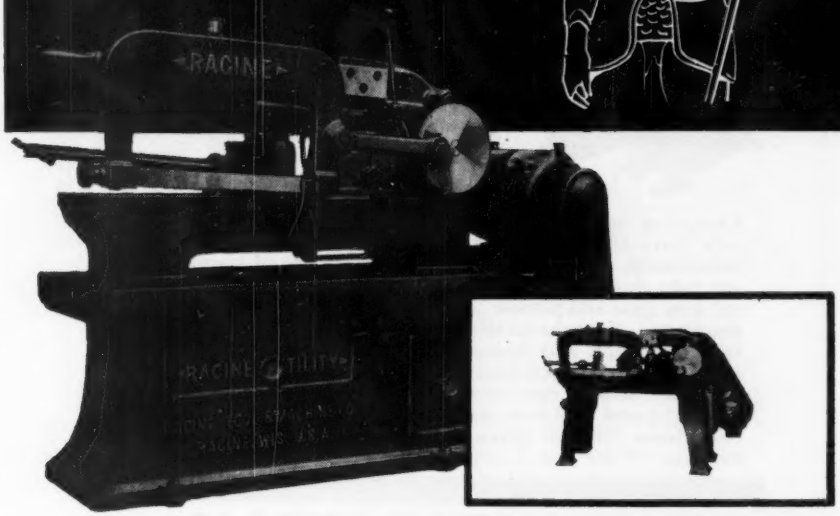
sort of plan will begin to appear. At that point the effort is aimed entirely at planning to make the broad decision of the group as effective as possible. Naturally, the group will want a plan that will be workable; consequently it must be tested and checked by most of the members present. A plan to be realistic must be based on the actual facts of the situation. Consequently, in many cases, conferences of the problem solving variety usually are continued over a period of weeks with the use of committees who act between meetings to secure additional information and work out specific details. What usually happens is that the problem solving conference after one or two sessions will develop into the planning conference.

The Planning Conference

With the planning conference, the chairman introduces the proposed program or method which has grown up out of the problem solving conference, and asks the group to express their wishes in detail. After a common objective satisfactory to all of the group has been found, a free discussion of ways and means continues

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Stop the penalties, the losses, the drop in profits that old equipment costs you. Modernize the first step in your metal working processes with late design RACINE Power Saws.

A new, *all hydraulic* RACINE saw to replace worn, obsolete equipment, another unit added to your production line will pay their way in every shop.

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until specific means of making effective their objective has been found.

As far as maintaining order and directing the group's attention to the items under discussion are concerned, the chairman's functions are very similar to those in the problem solving conference. It is imperative that the chairman or group leader be impartial—that he express no opinions calculated to influence the ultimate action of the group.

Consequently it is essential, that the chairman be more alert than anyone else in the group to be aware at all times of the relationship of ideas and the relevancy of opinions expressed. He may even summarize from time to time during the meeting what has been discussed in order to keep the group posted on the relationship of various elements of the plan as they are worked out.

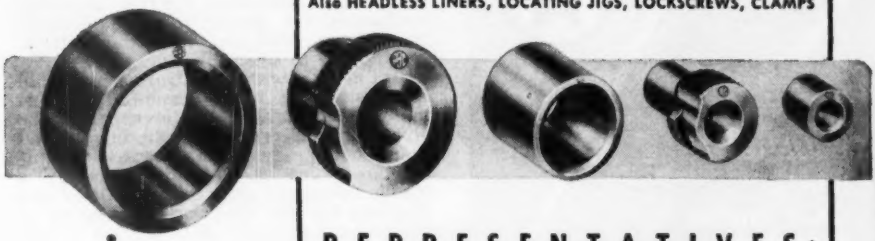
If the meetings continue over a period of weeks, and if a secretary is used to take minutes of the meeting, ordinarily copies of the minutes will be distributed to the members for study between sessions.

When a plan has been finally determined upon, the chairman will make a

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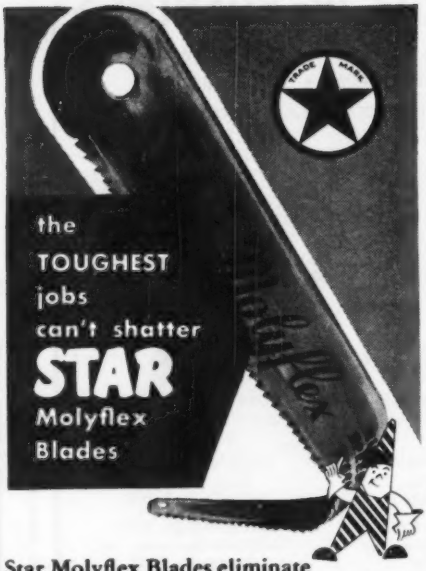
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He also has the handy Star Wall Chart and the useful 32-page booklet, "Metal Cutting". Both are packed with valuable information on blades and cutting techniques. Get your copies today. They're FREE.



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final summary of it with reminders to the individual members of the group as to their duties, committments, or responsibilities under the plan to carry out its various details.

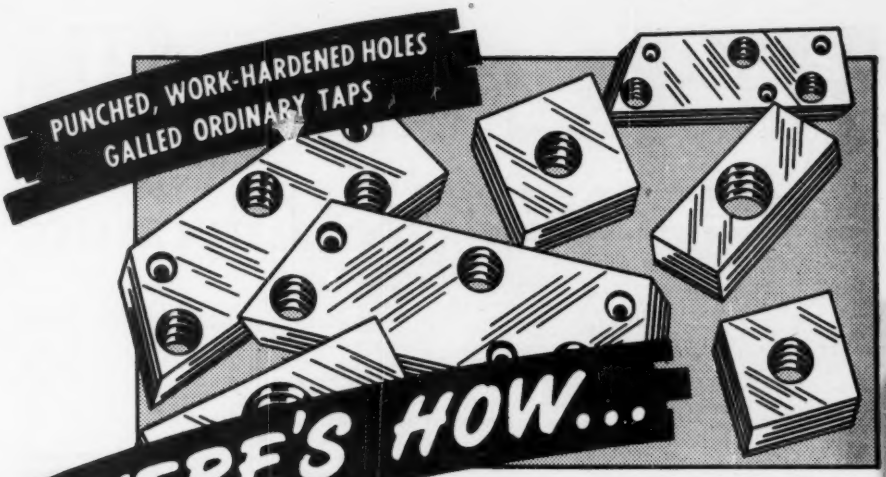
The rules required for the planning conference are similar to those of other conferences, with one or two additions. In addition to speaking briefly, one person at a time, with a control of emotional outbursts, it is highly essential both in the problem solving conference and the planning conference that individual thoughts expressed be relevant to the immediate point of discussion. Usually a formal committee system is organized and operates for the duration of a series of these conferences. Usually it must be understood that if from such discussion individual duties are developed which require performance by members of the group, that these duties will be carried out in proper fashion. Finally, it is usually understood in a problem solving and planning conference that at the executive level that ultimate decisions are obtained by votes in a fashion sufficiently accurate to satisfy the members that the will of the majority prevails.

A brief check back at the comparative chart will serve to remind the reader at this point of the growing burden upon the chairman and the growing necessity for rules of procedure as the complexity of participation increases and as the importance of the group action increases.

THE END

The Cincinnati Milling Company announces three expansion programs of interest to American industry.

1) Carlisle Chemical Works, Inc., a subsidiary of Cincinnati Milling, is moving into its new plant at Reading, Ohio. The first processing units have been started, and Carlisle expects to have all units in operation this fall.
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3) The increased line of machine tools has created tight spots in floor space of Cincinnati Milling's main plants. Since recreation fields and parking lots will be retained for the benefit of employees, the Company decided to build a new plant within easy reach of Cincinnati, on a site just outside Wilmington, Ohio. Construction should start promptly.



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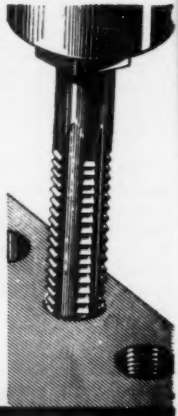
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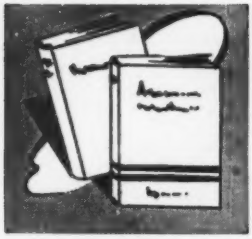
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Available Literature

1. **Deep Hole Drilling Tool** eliminates pullouts, speeds up drilling, and improves concentricity. It comes in 3 sizes: Nos. 00, 0, and 2. Folder introducing this new tool also contains specifications and prices. May be secured from **Boyar-Schultz Corp., 2110 Walnut St., Chicago 12, Ill.**

2. **Mild Steel Electrodes** are described in a new 14-page catalog illustrated with performance charts and application photographs. Information also includes application data, standard sizes and packages, recommended currents, and operating procedures, and other material useful in using the correct electrode on mild steel applications. Available upon request to **Metal & Thermit Corp., 100 E. 42nd St., New York 17, N. Y.**

3. **Heavy Duty Foundry Shakeouts,** full floating type with automatic unbalanced weight control, come in 6 sizes with capacities to 30,000 pounds. Folder No. 2338, containing descriptive data and specifications will be sent on request to **Link-Belt Co., 301 W. Pershing Rd., Chicago 9, Ill.**

4. **Mor-Grip V-Belts** for fractional horsepower, are built for flexibility, efficiency, long life, etc. Bulletin FHP-101 describes this line of belts, giving comparative details, interchangeable data, and prices covering the three standard cross sections available. Obtainable free of charge by writing **Maurey Mfg. Corp., V-Belt Div., 2915 So. Wabash Ave., Chicago 16, Ill.**

5. **Two New Universal Tool Grinding Machines** are described in a 7-page bulletin together with close-ups showing their best features, some of which are: movability and rotability of the grinding head, the extended tailstock, optical grinding equipment, and the adjustable mouthpiece for the built-in exhaust unit. Write for bulletin to **Nife, Inc., 165 Broadway, New York 6, N. Y.**

6. **Quick-Change Holder,** illustrated and discussed briefly in a 4-page folder, provides for several operations—pinfacing, countersinking, trepanning, etc. requiring different sizes of cutters. Independent cutters and pilots cut stock and replacement costs by more than 50%. Made in two sizes with No. 2 and 3 Morse taper shanks. Available from **Newage International, Inc., 521 5th Ave., New York 17, N. Y.**

7. **"Yates-American Products,"** a 32-page catalog, gives the manufacturing story of its products made in their three divisions. Complete facilities put out machines and products which give long dependable service. Some of the departments illustrated and discussed are: cutter and knife, electric motor, heat transfer products, and general refrigeration. Obtainable from **Yates-American Machine Co., Beloit, Wis.**

8. **Sine Fixture Keys** eliminates milling fixture key slots and reduces extra setups. Bulletin published by **Jergens Tool Specialty Co., 712 E. 163rd St., Cleveland 10, Ohio** tells how the fixture key is used; specifications and prices are also listed.

9. **Pneumatic and Hydropneumatic Die Cushions,** illustrated and described in a 25-page catalog, are applicable to all makes of presses. Specifications and helpful data in planning installations and the operation of cushions are also given. Ask for bulletin 212 when writing **Clearing Machine Corp., 6499 W. 65th St., Chicago 38, Ill.**

10. **Cylindrical Grinders,** standard and special, including universal, plain, roll, crankshaft, cam, valve, multiple wheel, and race grinders are illustrated and explained in a 28-page general catalog. Design features are explained by diagrams, and machine applications are illustrated by operation sketches. Sent upon request to **Landis Tool Co., Waynesboro, Pa.**

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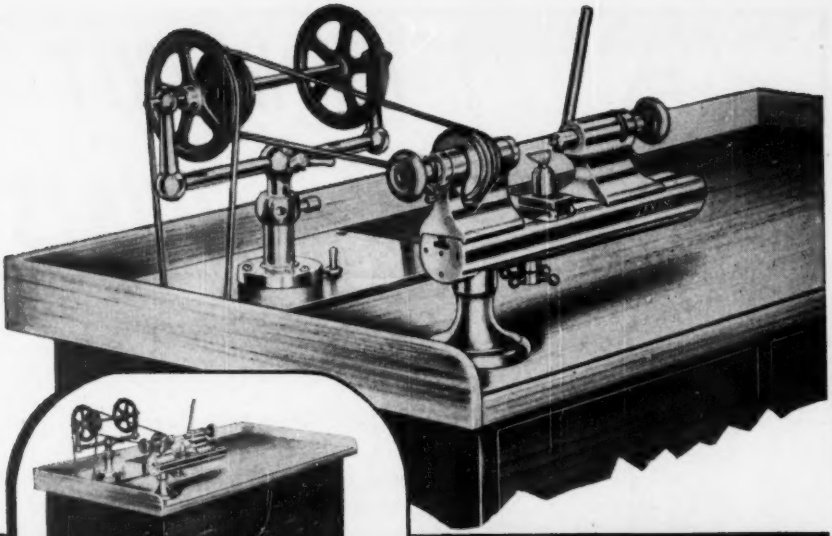
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11. Fra-sure Variable Speed Transmissions with automatic speed locking device are used for various speed control with fractional horsepower motors for such machines as automatic scales, bag makers, conveyors, etc. They lock against speed slippage, assure constant selected speeds, and prolong life of belts. Other features are described in a bulletin available from **Frazier & Son, 338 Cortlandt St., Belleville, N. J.**

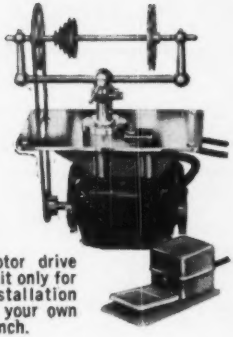
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15. Speed Grip Nut Retainer fastens square nuts to sheet metal parts, reducing production time and improving quality. It eliminates welding, staking, and clinching operations. Complete data of the 49 stock sizes are included in 7-page bulletin, No. 245-3 published by **Tinnerman Products, Inc., Cleveland 13, Ohio.**

16. Negative-Gradient Elastic Member in four forms: extension spring, type A motor, type B motor, and clamps is described in a 4-page bulletin, No. 310A. Drawings and photographs show the construction, operation, and application of each form. Bulletin will be sent free upon request to **Mr. Ralph P. Coleman, Jr., Hunter Spring Co., 1 Spring Ave., Lansdale, Pa.**

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take a hole and wrap high quality bushing material around it for longer life ★ lower cost



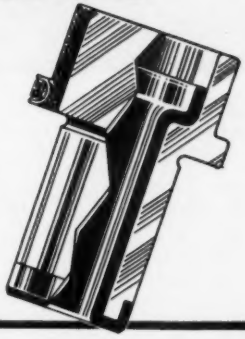


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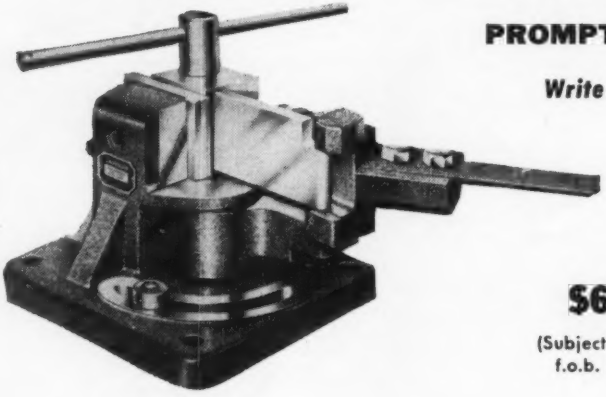
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19. Ring-Oiling Bushings for loose pulleys with one application of oil will last from 30 to 60 days thus saving labor and lubricant. Bulletin No. 22 illustrates and describes these bushings together with list prices. Ring-Oiling Clutches are also briefly dicussed. Available upon request to **Brown Engineering Co., Reading, Pa.**

20. "RLM" Standard Specifications for Industrial Lighting Units", a 44-page newly-revised booklet, contains detailed

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Tap holder is lighter, smaller in diameter, affords easier tapping close to walls or shoulders, eliminates "chewed" tap shanks. Holds tap true.

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PROCUNIER HIGH SPEED TAP HEAD SHOWS CONSISTENTLY BETTER PERFORMANCE

When you have to **produce**—and time is short . . . put Procunier High Speed Tapping equipment on the job and **watch production climb!** Here is the secret . . . here's why Procunier Tap Heads turn out precision tapping with fewer rejects, fewer broken taps: Tap driving pressure is **automatically regulated** by the amount of pressure applied to the unique Procunier clutch. An operator can quickly detect dull or "loaded" taps—by the pressure needed to drive them. Blind tapping is done as easily as through tapping! Improved features include: heat treated gear mechanism for long, trouble-free life; ball bearings for lifetime accuracy; simple, one-hole lubrication system . . . as well as many others. WRITE TODAY for illustrated brochure giving complete details, specifications and prices. Simply fill in and mail the coupon right now.

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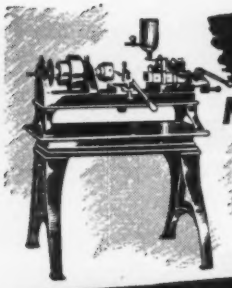
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specifications for 18 fluorescent and incandescent industrial lighting units. Longer-length slimline lamps are included. Specifications cover materials, shielding angle, reflector dimensions and contour, acceptance criterion, and many others. Published by **RLM Standards Institute, 326 W. Madison St., Chicago 6, Ill.**

21. **Low Amperage Electrode** 24 lessens danger of distortion, cracks, and brittleness, and eliminates preheating large castings. Bulletin EU-55 contains technical data, case histories, and a study of cast iron welding failures and methods of overcoming them. Available from **Eutectic Welding Alloy Corp., 40 Worth St., New York 13, N. Y.**

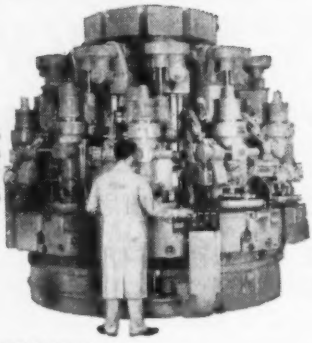
22. **Magnetic Controls**, including starters which feature a start-stop control, contacters, 4-6-9 pole relays, and accessories, are illustrated and discussed fully in a 16-page catalog. Specifications and prices are also given. Catalog 50 is now available from the **Furnas Electric Co., Batavia, Ill.**

23. **Clipper Seals, precision** moulded for accurate and maximum life, are described in a 16-page brochure. Also contains



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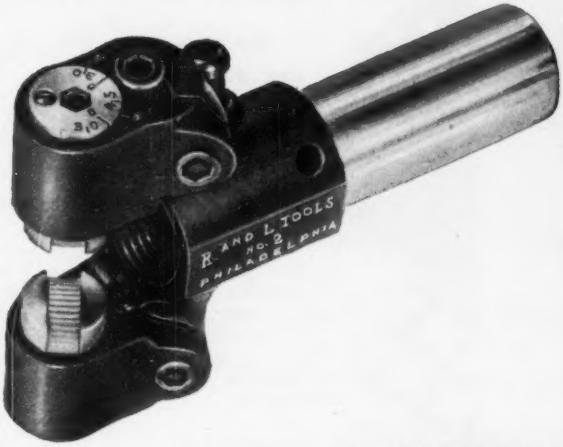
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sections on their prinicple, construction, advantages in various applications, installation data, and other pertinent information. Helpful to designers, engineers, and maintenance men. May be secured by writing **John-Manville, 22 E. 40th St., New York 16, N. Y.**

24. **Hydraulic Remote Controls** for industrial use are described in 7-page bulletin 20-105. Two series of controls and accessories are included, featuring the use of a single line up to 200 feet long for connecting transmitter and receiver, balance obtained by use of opposing springs, and easy synchronization. Sent upon request to **C. E. Hohl, Industrial Sales Section, Sperry Products, Inc., Danbury, Conn.**

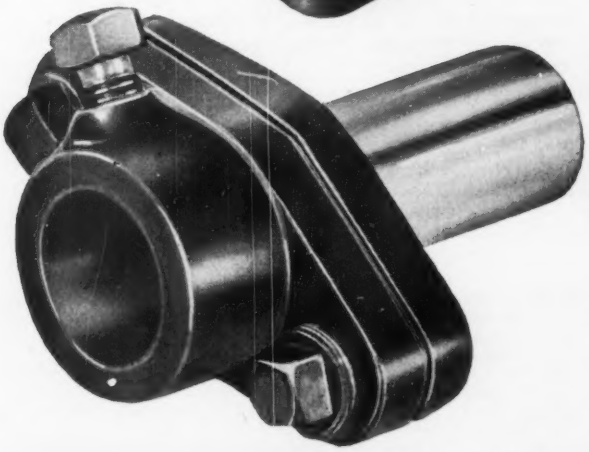
25. **Electroaire Valve**, air-powered and electrically controlled by solenoids guaranteed against burnout, is described in detail with wiring diagrams and dimensional drawings in bulletin No. AU-250. Its speed, compactness, and low voltage makes it the ideal, complete air control unit. Copy sent upon request to **Mr. W. C. Richards, The Bellows Co., 222 W. Market St., Akron, Ohio.**

R AND L TOOLS



NEW! R and L KNURLING TOOL

New streamlined design has half the weight of existing tools of comparable size, affords better grip and controls of knurls. Available in a complete range of sizes. Only one Hex Wrench needed for all adjustments.



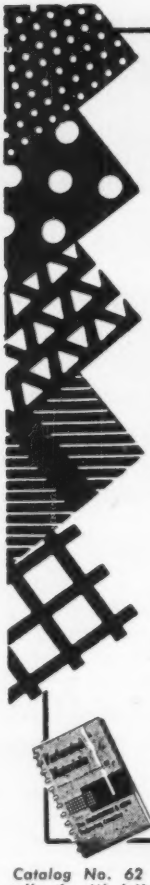
R and L FLOATING DRILL HOLDERS

For Holding Drills — Reamer or other tools
No. 00—⅜" dia. shank
No. 1—¾" dia. shank
No. 2— 1" dia. shank

LARGER SIZES MADE TO ORDER

WRITE FOR CATALOG

R AND L TOOLS
1825 BRISTOL ST., NICETOWN, PHILADELPHIA 40, PA.



Investigate the Advantages of H & K PERFORATIONS

—for cleaning, grading, straining and filtering . . . guarding and ventilating . . . accoustical treatment . . . ornamental enclosure, and related problems of product and machine design.

You have a wide selection of patterns to choose from, all accurately perforated. For commercial processing, perforations may be had with as close as ±.0005". Materials include practically all metals and sheet materials such as plastics, fabrikoids, plywood, etc. Ornamental grilles are furnished in lightweight quality stainless, bronze, brass, aluminum, etc.

Perforated sheets may be furnished rolled, formed, sheared, welded, brazed or otherwise fabricated to your specifications.

The Harrington & King Perforating Co

Catalog No. 62 tells the "hole" story—write for it!

5635 Fillmore St., Chicago 44, Ill.
114 Liberty St., New York 6, N.Y.

26. Visual Grind, new thoroughly proven visual grinder, insures greater accuracy, and realizes the utmost in quality and economy. Features the exclusive Bounce-Back and Reflecto-Image. 6-page bulletin announcing this new machine is available from **The Cleveland Grinding Machine Co., 6514 St. Clair Ave., Cleveland 3, Ohio.**

27. Flo-Scopes, air and gas flow rate indicators, are individually calibrated for the characteristics of the gases to be measured and are used with combustion equipment in chemical plants when accurate data about gas-air mixtures are required. Descriptive 7-page bulletin, SC-4.1, is available from **Selas Corp. of America, Philadelphia 34, Pa.**

28. Supeream, the supreme stub reamer in decimal sizes for screw machines, turret lathes, and drill presses, is made of finest grade high-speed 18-4-1 steel and heat treated with modern equipment. 4-page folder discussing this product together with price list and specifications is obtainable from **Twentieth Century Mfg. Co., 3716 Montrose Ave., Chicago 18, Ill.**

29. Thirty Templates for the use of en-

* Fluid Power Improves Production

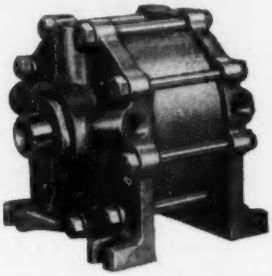
"LOGAN" AIR CYLINDERS

STANDARD AND HEAVY-DUTY MILL-TYPE

LOGAN FEATURES THAT ASSURE PEAK PERFORMANCE AND LONG LIFE . . .

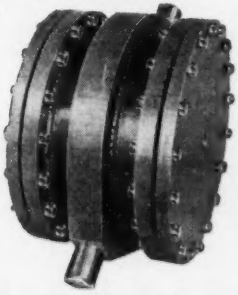
- Larger ports for quicker response.
- More sturdy construction.
- Standard models available with or without cushioning.

Fast-Acting, Positive Controlled Power . . . At Low Cost



LOGAN STANDARD AIR CYLINDERS

Replace most manual operations . . . eliminate human error.



LOGAN HEAVY-DUTY MILL-TYPE AIR CYLINDERS

For steel mill or aluminum extrusion mill, foundry and heavy-duty service.

7 STANDARD MOUNTING TYPES

Standard sizes from 1½" to 12" bore; maximum stroke, 18 feet.

Special to meet your requirements.

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Logan SAVES * TIME * EFFORT * MOTION

Air and Hydraulic Equipment

LOGANSPORT MACHINE CO., INC. 807 Center Ave. Logansport, Ind.

CHUCKS • CYLINDERS • VALVES • PRESSES • SURE-FLOW COOLANT PUMPS

FREE CATALOG

Get your free copy of catalog containing complete information on Logan air cylinders, control valves and air accessories.



FLUID POWER SPECIALISTS SINCE 1916



high speed **STAKING** fatigue free
The **ELECTROPUNCH**

shown above is used by an electrical switch manufacturer turning out 3500 staked assemblies an hour. This versatile electric-impact hammer is used to cut, swage, crimp, mark or rivet. It is economical, mobile, compact. Just plug in to your nearest 115 v. A.C. outlet and begin work.

Write for complete descriptive folder.

BLACK & WEBSTER, INC.

305 PLEASANT STREET, NEEDHAM 92, MASS.

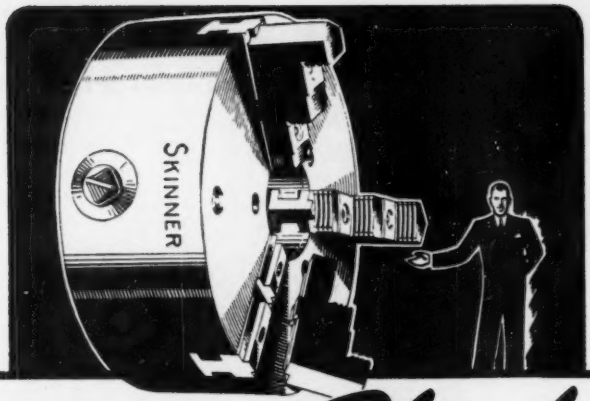
Also Manufacturers of the ELECTROPRESS for heavier duty jobs.

gineers, draftsmen, architects, and designers are illustrated and described in a new 6-page catalog, No. 50. Also featured is the depiction of templates made to order for private drafting room use, or for customer distribution by companies concerned. Sent upon request to **Rapid-design, Inc., Box 592, Glendale, Calif.**

30. **Micro X and Micro EE Hones** remove metal rapidly, cut freely and cooly, and produce fine finishes, and are made to fit any honing machine. Other data covering these abrasive hones is contained in a new 4-page folder published by **Mid-West Abrasive Co., Owosso, Mich.**

31. **Mixitred**, pure mineral asphalt, is recommended as a tough-wearing resurfacer for concrete, wood, metal, brick, or composition floors. Also ideal for patching worn areas and an underlayment for tile and linoleum. Description and application instructions are given in a leaflet now available upon request to **Rock-Tred Corp., 7440-7450 N. St. Louis Ave., Skokie, Ill.**

32. **Milwaukee Die Filer** with a new deep-throated all purpose overarm cuts tool and die making costs, and permits instant inspection. Other features include



SERIES 3900
SELF-CENTERING
SCROLL CHUCK

SKINNER 3-JAW SCROLL *Chucks*

LARGE in VALUE..

LONG in LIFE...

BIG in QUALITY...

LARGE IN VALUE . . . because Skinner 3-Jaw Self-Centering Scroll Chucks are made with the most modern machines and by the most modern methods — there is more for your money in Skinner Chucks because accuracy is built in to last.

LONG IN LIFE . . . because every moving part is made of alloy steel, properly heat-treated, then ground to gage — and every moving part is grease lubricated from a single Alemite fitting. Interchangeability is a "must" in every Skinner Chuck.

BIG IN QUALITY . . . because, for 61 years, Skinner has provided chucks to meet the latest machine tool requirements. Skinner quality starts with modern design and makes itself evident in every step of construction. There are no better chucks made.

Write for your free copy of Catalog No. 61.

THE SKINNER CHUCK COMPANY
341 CHURCH STREET, NEW BRITAIN, CONN.

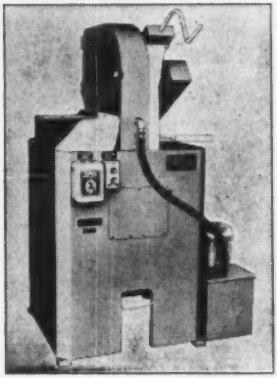
CONSULT YOUR SKINNER DEALER FOR DETAILS



HAND & POWER OPERATED MACHINE CHUCKS—AIR CHUCK EQUIPMENT
—FACE PLATE JAWS—MACHINE VISES

ABRASIVE CUTTING . .

Wet or Dry with this low-priced machine



The Model 15 Campbell Abrasive Cutting Machine will cut solid bar stock and tubing economically. Material may be steel of any analysis—annealed or unannealed—brass, monel, ceramic or phenolic plastic.

Wet model makes extremely smooth, clean cuts to a tolerance of a few thousandths—with little or no burr or burn.

Through manufacturing economies, this machine can be produced and sold at an attractively low price compared with previous comparable models.

For detailed information, write for Bulletin DH-102-C.

CAMPBELL MACHINE DIVISION
American Chain & Cable
937 Connecticut Avenue
Bridgeport 2, Conn.

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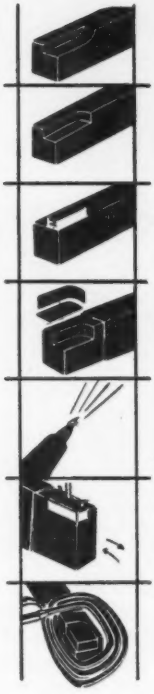
two operating speeds and Scotch-yoke mechanism to impart a vertical filing stroke without bell-mouthing. New bulletin describing this filer and the improved file roller support is available from **Rice Pump & Machine Co., Div. of Milwaukee Chaplet & Mfg. Co., Milwaukee 4, Wis.**

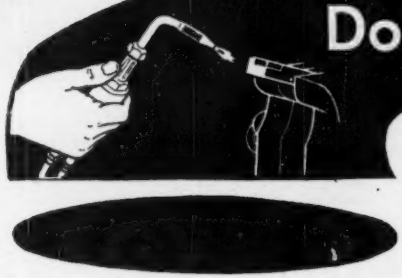
33. AMER-glass, replaceable type air filter for use in forced warm air heating systems, air conditioners, and small central systems, is non-flammable, sanitary, and non-absorptive. Complete data is given in bulletin No. 211 plus installation data covering frame units. Send your request to **American Air Filter Co., Inc., Louisville, Kentucky.**

34. Metalworkers Press Brakes, 11-page catalog, contains information on the complete line of Airtherm's press brakes. It also includes specifications, construction details, dimensions table, and illustrated optional features such as ram adjustment indicators, load indicator, and wider ram and bend. Send for catalog No. 904 from **Airtherm Mfg. Co., St. Louis 10, Missouri.**

35. DYMO Diamond Compound is now available in accordance with the Bureau of Standards publication CS123-49. The

Smart Carbide Users BRAZE & SAVE! Do You?





Are you taking advantage of the savings in money, time and headaches by brazing your own carbide tools with **ADAMAS TUNGSTEN CARBIDE?**

Brazing your own tools with durable **ADAMAS** carbide is simple, requiring no special equipment or technical knowledge.

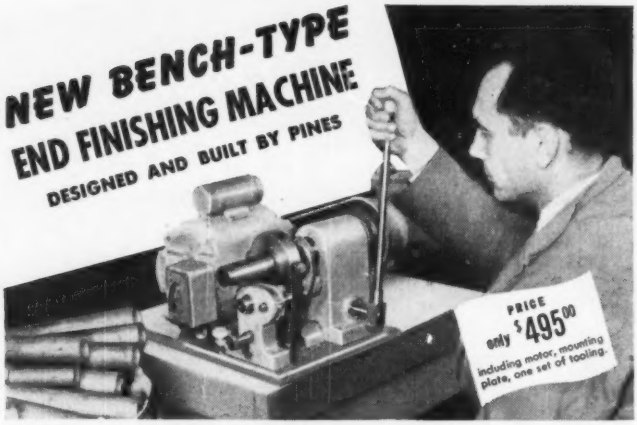
How you save money— ★ Shank steel and **ADAMAS** carbide tips are inexpensive. ★ Increased use of present tool room facilities. ★ Preformed **ADAMAS** tips require little grinding with costly diamond wheels. ★ Maintain economical low level of finished tool inventory.

How you save time— ★ Quick delivery on standard and special **ADAMAS** tips. ★ Eliminate costly down time waiting for tools. ★ Direct control of carbide tool production schedules.

Write for valuable free illustrated booklet "Braze and Save" to Dept. B

Convinced of the advantages and economy for carbide tool users, **ADAMAS** is concentrating on the job of maining the *fastest delivery schedule* of *quality* tungsten carbide *at lowest competitive prices.*

ADAMAS CARBIDE CORPORATION
1000 South 4th Street • Harrison, New Jersey



Saves Time on deburring, facing, chamfering, center drilling, reaming operations . . .

Designed to speed tube, pipe, and rod end-finishing work of any size or length up to 2" diameter. Has a new-type chuck and clamping unit, automatic swing-type stock stop, interchangeable jaw inserts, multiple tool holders, precision spindle bearings, ½ hp. motor, 8-speed sheave. Portable, weighs only 170 lbs. Fast, easy to operate, has quick change-over features. Forward movement of operating lever, clamps piece, removes stock stop, feeds work to cutters. Operator always has one hand free for loading. Saves time. Typical production: 400-500 tube ends per hour. Speeds output.

Write for Free Bulletin





698 WALNUT AURORA, ILLINOIS

Get more facts today on this new cost-cutting tool. Larger models up to 5" capacity also available.

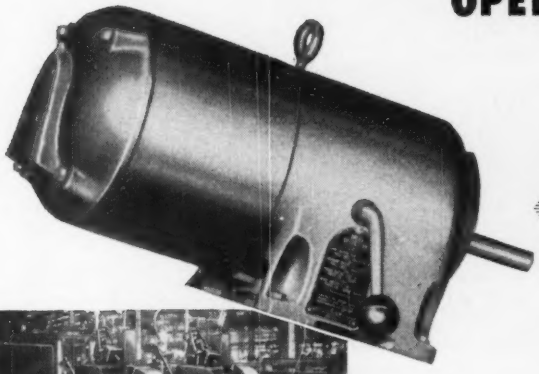
For long-run work ask for data on semi-automatic models with foot switch control.

new standard defines vital properties of diamond abrasive powders and limits the content of fines below the indicated range. Until conversion is complete, DYMO is available with both old and new standards. Copies of "Grading of Diamond Powder" available from **Industrial Products Div., Elgin Nat'l. Watch Co., Elgin, Ill.**

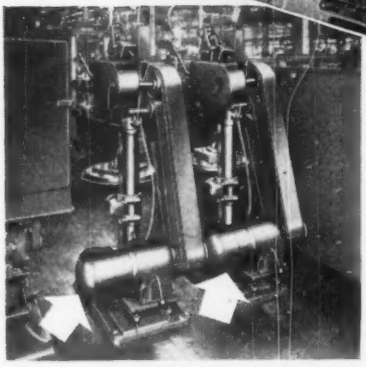
36. **Surfamax Filters** with porous stainless steel element, are illustrated and described in an 8-page booklet. Also contains advantages, uses, operation and manufacturing methods. They provide maximum filter surface in minimum volume. Types of filters, and their arrangements are included together with engineering information on dimensions and specifications. Send for this informative booklet from **Micro Metallic Corp., 193 Bradford St., Brooklyn, N. Y.**

37. **Swing-Rest Roll Grinders** provide faster grinding and finer finishes, with closer control of roll accuracy and crown shape. Features exclusive swing-rest principle, and crowning device. Illustrated 16-page bulletin 118 describing this grinder may be secured from **Farrel-Birmingham Co., Inc., Ansonia, Conn.**

HERE IS THE ANSWER TO INCREASING PRODUCTION WHILE LOWERING OPERATING COSTS



THE LIMA GEARSHIFT DRIVE

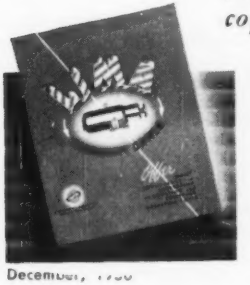


Above view shows Lima Drives applied to two Garvin Automatic Tappers. Photo courtesy International Harvester Company.

LIMA GEARSHIFT DRIVES have very definitely proven themselves to be the answer to lower operating costs and greater flexibility of machine operations. LIMA GEARSHIFT DRIVES are widely accepted by manufacturers of original equipment, as an integral "selective-speed" power source.

LIMA DRIVES are available for operation on single phase power supplies in ½ and ¾ hp sizes and for polyphase in sizes from ½ to 25 hp.

LIMA'S New Illustrated Drive Bulletin DB-1 is just off the press—send for your copy today.



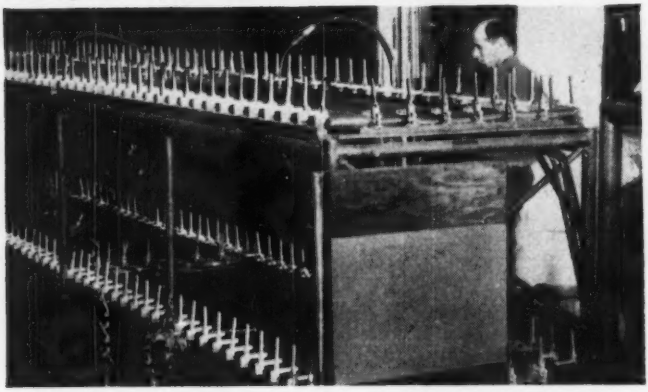
LIMA

Representation in principal cities

THE LIMA ELECTRIC MOTOR COMPANY

214 Findlay Road • Lima, Ohio

Another battery of
KNU-VISE CLAMPS
to expedite production of hundreds of B-36 parts



Knu-vise clamps are installed on this special table fixture in Consolidated Vultee's San Diego plant to provide an air-tight seal around a rubber blanket. Beneath the blanket are parts for B-36 bombers which are joined by Metlbond (a metal adhesive) instead of rivets. The fixture is moved into a furnace where heat and pressure are applied.

The quick acting clamps expedite production of hundreds of B-36 parts—the clamps can be secured and unlocked in a fraction of the time required if screws were used.

Approximately 800 Knu-vise clamps are installed on fixtures in Convair's Metlbond assembly department. On this fixture, the clamps are spaced at 5-inch intervals.

Sales Representatives in Principal Cities

KNU-VISE PRODUCTS **LAPEER MFG. CO.**

3056 DAVISON ROAD • LAPEER, MICHIGAN

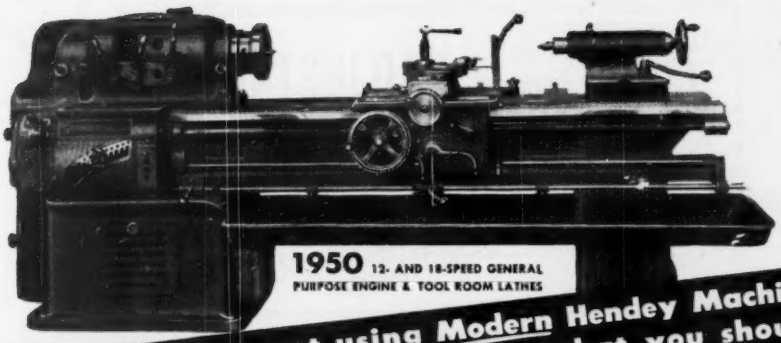
Western Division, 422 Magnolia Street, Glendale, California
Canadian Stocking Distributor: Higginson Engr. Sales
P.O. Box 23, Hamilton, Ontario

38. **Hydromatic Flute Miller** No. 90FM indexes and mills straight or spiral flutes in counterbores, taps, ends mills, or any other work requiring a dividing head. Leaflet describing this machine shows work done and also lists its various features. Available from **The Wardwell Mfg. Co., 3167 Fulton Rd., Cleveland, O.**

39. **Cro-Hone,** a compact wet-blaster of 18-8 stainless steel having 2 water tight gasketed doors, is designed for easy maintenance and low cost. Bulletin describing this new machine and listing several proven industrial uses may be had by writing **The Cro-Plate Co., Inc., 3343-47 Main St., Hartford 5, Conn.**

40. **Bantam Champ Arc Welders** are amply powered, easily and accurately adjustable, and have good arc stability. Other features are listed in a recent bulletin describing and illustrating these welders. Send for your copy from **The Hobart Brothers Co., Box DM 867, Troy, Ohio.**

41. **Dynograph Balancer,** a precision, electronic device for locating and measuring the two separate components of dynamic unbalance is fully described in



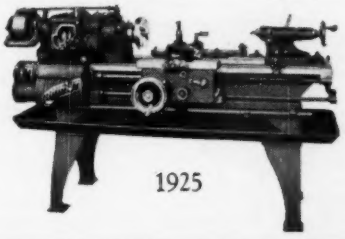
1950 12- AND 18-SPEED GENERAL PURPOSE ENGINE & TOOL ROOM LATHES

. . . If you are not using Modern Hendey Machines you are not earning the profits that you should!



Hendey Engine and Tool Room Lathes have been, and always will be, tops for accuracy. But, are you aware of the many other modern features of the new Hendey line? Like all Hendey Lathes, the 12- and 18-speed now have induction hardened and precision ground bed ways for both carriage and tailstock. Every important unit has fully automatic lubrication. The rear end of the spindle is graduated for indexing when cutting multiple threads, and there are 36 thread and feed changes. The precision, all-geared headstock is powered from a built-in motor in the cabinet leg. Spindle speed ranges from 19-1000 R.P.M. A choice of cam lock or long taper key drive spindle noses. Modern Hendey Tool Room Lathes are available with swings of 9", 12", 14", 16", 18", 20" and 24". Write today for full details and complete specifications.

This 8-speed Hendey Engine Lathe has long been obsoleted by the all-new Hendey 12- and 18-speed lathes. The 8-speed bed is not hardened and precision ground. Maximum spindle speed is only 426 R.P.M. Although a masterpiece of design and construction in its day, the 8-speed has been replaced by progressive manufacturers, because the 12- and 18-speed offer every modern improvement necessary to earn maximum profits.



1925

Continuous, advanced engineering by Hendey is worth watching — and must be watched if you are to earn full profits from your lathes and shapers. For complete particulars and prices, contact your nearest Hendey office.

MODERN Hendey

THE HENDEY MACHINE COMPANY
Main Office & Plant: Torrington, Conn.
Branch Offices: New York, Chicago, Boston, Detroit, Rochester, Los Angeles, San Francisco.
Representatives: Philadelphia, Cleveland, Pittsburgh

Chicago "ADJUSTABLE" SHOP SPOT-LIGHT



MODEL 2000-I

for "On the Spot" lighting

Chicago shop lights are designed to place light at the exact spot desired. Just a touch of the hand performs this operation.

NO SCREWS TO ADJUST—NO NUTS TO TIGHTEN

Each arm is equipped with horizontal and vertical swivels for 100% flexibility. Shop lights come in a complete range of sizes and can be purchased with various types of mountings.

All models have Underwriters approved cords, plugs and sockets. Each model is finished in grey baked enamel and comes complete with green parabola shade.

The No. 2000-1 shop light is one of our most popular models. This light can be mounted on either horizontal or vertical surfaces. Available in 24", 30", and 44" lengths.

$5.25 (*EACH in lots of 12*
Quantities of 6 @ $5.95 ea.
Single Units @ $7.95 ea.
F.O.B. Chicago, Ill.

Manufactured by
Chicago DIE CASTING MFG. CO.
2515-17 West Monroe Street
Chicago 12, Illinois

a 4-page bulletin together with machine specifications. Its flexibility enables it to be adaptable for special purposes, several of which are illustrated. Available from **R. B. Annis Co., 1101 N. Delaware St., Indianapolis 2, Ind.**

42. America Under Socialism, a 16-page four-color illustrated booklet tells the story of what happens when Jack Hanson, a "regular fellow," becomes blinded by the bright promises of so-called security only to be disillusioned. Story closes with the plea . . . "You Must Decide." Available from **The National Research Bureau, Inc., 415 N. Dearborn St., Chicago 10, Ill.**

43. Sundstrand Magnetic Chucks feature the power-grip control which eliminates tubes and their periodic burn-outs. A 16-page booklet, Form No. MC-1 illustrates their wide application in tool room work, in general purpose milling and in production machining; also shows how magnetic fixtures can be applied. Sent upon request to **Sundstrand Magnetic Products Co., 1306 18th Ave., Rockford, Ill.**

44. Catalog No. 103, 42 pages, cover standard and special retainers and interchange-

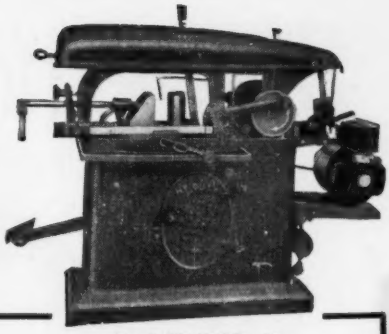
KELLER



No. 1
BENCH MODEL

Choose...

THE MODEL TO FIT YOUR REQUIREMENT



No. 3 HY-DUTY with
PRESSURE FEED CONTROL



No. 3C WET CUT
with AUTO. LIFT

You'll get...

EXTRA POWER • SPEED • ECONOMY

EFFICIENT — The KELLER POWER HACK SAWS' simple efficient design gives you greater power and speed. Longer blade life, simpler maintenance and sturdy construction lowers your operating costs and increases production.

ECONOMICAL — KELLER POWER HACK SAWS are available in a wide range of sizes, from the No. 1 BENCH MODEL at $80 to the No. 3 HY-DUTY MODEL at $375, complete with motors. It's easy to select the model that best meets your requirements.



No. 1 BENCH
MODEL with
AUTO. LIFT



No. 3B DRY CUT
with AUTO. LIFT



No. 1
FLOOR MODEL



No. 3A
DRY CUT



No. 1 FLOOR
MODEL with
AUTO. LIFT



WRITE TODAY FOR FREE BULLETIN

Sales Service Machine Tool Co.



PRESS RITE PRESSES

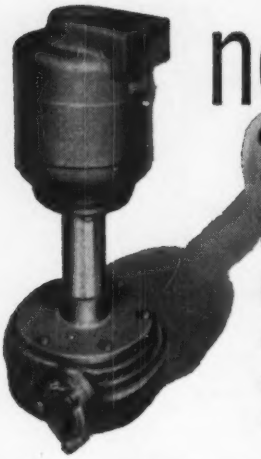


SHAPE RITE SHAPERS



KELLER POWER HACK SAWS

2357 UNIVERSITY AVENUE
ST. PAUL 4, MINNESOTA



no shadow
OF A DOUBT...
When you use
RUTHMAN
GUSHER
COOLANT PUMPS
on your metal-cutting equipment

You are sure of operating efficiency and long trouble free service when you specify Ruthman Gusher Coolant Pumps on your metal-cutting machinery. For Ruthman Gusher Pumps are designed and manufactured by Ruthman, the *originator* of the vertical motorized machine-tool coolant pump, and their engineers combine years of practical experience with continuing research and development to maintain leadership and bring you the best in coolant pumps.
Follow the leading manufacturers of machine tools and always specify Ruthman Gusher Coolant Pumps. You'll like their good appearance, sturdy, simple construction and their steady, dependable performance. Write for our complete catalog today.

THE RUTHMAN MACHINERY CO.
1816 Reading Road Cincinnati 2, Ohio

able punches together with specifications and prices. New products have been added such as high speed standard interchangeable punches, die buttons, both press fit and interchangeable. One section contains illustrations of typical interchangeable punch applications. Free upon request to **Whitman & Barnes, Div. of United Drill and Tool Corp., Plymouth, Mich.**

45. Truarc Retaining Rings are illustrated and described in 8-page catalog, 4K-W. Also included are 42 drawings of cost-saving applications; special-type rings, assembly tools, fixtures, and application pliers are shown. Available upon request to **Waldes Kohinoor, Inc., 47-16 Austel Pl., Long Island City 1, New York.**

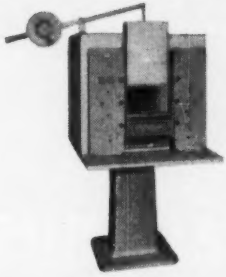
46. "Katolight", in a recent circular, describes AC-DC generating plants designed for farms, homes, industry, etc., some of which are 700, 1,200, 3,500 and 15,000 watt AC plants. Illustrations as well as specifications are also included. Available from **Kato Engineering Co., Mankato, Minnesota.**

47. Triple-Chip Slitting Saws with dual drive adaptors are illustrated in a new

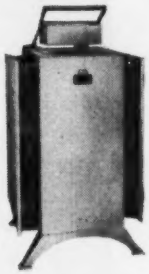
FOR LONGER TOOL LIFE, LOWER TOOL COSTS, AND QUALITY HIGH SPEED STEEL HARDENING . . .



Sentry Model "2Y" — For hardening small tools and cutters of moly, tungsten and cobalt high speed steels.



Sentry Model "5Y" — For handling larger tools and cutters. Flexible, economical, quick to heat up.



Sentry Model "YP"—Vertical Furnace for hardening long, slender drills, reamers, broaches, etc.

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Sentry Electric Furnaces produce quality hardening, maximum toughness and exceptional durability in high speed steel and high carbon high chrome. Edges stand up longer which means less frequent grindings, longer tool life and lower tool costs.

Sentry Furnaces utilize Sentry Diamond Blocks permitting full soaking of tools without danger of burning. No scaling. No decarburization. Produce a clean finish which eliminates finishing operations.



Ask for catalog D20

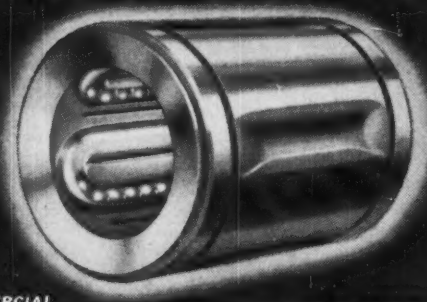
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FOXBORO, MASS., U.S.A.

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LINEAR MOTIONS



THE COMMERCIAL GRADE SERIES B

BALL BUSHING

Sliding linear motions are nearly always troublesome. Thousands of progressive engineers have solved this problem by application of the Precision Series A Ball Bushing.

The low-cost Commercial Grade Series B bearing is now added to the Ball Bushing line and offered to original equipment manufacturers. This ball bearing has been developed for support of linear motions in competitively priced, volume produced products where super precision is not essential. Alert designers can now make tremendous improvements in their products by using Ball Bushings on guide rods, reciprocating shafts, push-pull actions, or for support of any mechanism that is moved or shifted in a straight line.

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NEW 1½" NOW AVAILABLE

Now in production for ¼", ⅜", ½", ¾", 1" and 1½" shaft diameters. If you have a catalog, phone your representative or write us for new Data Sheet. If not, write for complete literature and the name of our representative in your city.

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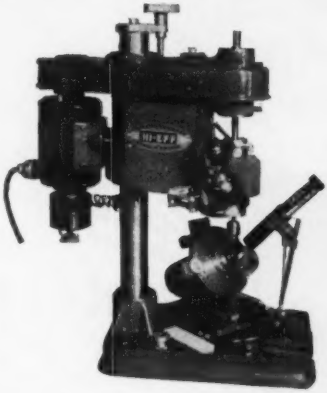
PROGRESSIVE MANUFACTURERS USE BALL BUSHINGS - A MAJOR IMPROVEMENT AT A MINOR COST

4-page bulletin No. 250. Also includes a discussion of triple-chip technique, dual drive advantages, interchangeability, and special applications and a stock list of sizes available. Issued by the **Motch & Merryweather Mach'y. Co., 715 Penton Bldg., Cleveland 13, O.**

48. 14" Drill Presses, "Economy Model", bench and floor type, with attachments and accessories are illustrated, described, and priced in bulletin No. 402. Complete specifications are also given. These presses feature one-piece head casting, automatic bolt tension, free-floating spindle, etc. Copy available from **South Bend Lathe Works, South Bend 22, Ind.**

49. Rotary Surface Grinders, Hanchett type, Nos. 24-A, 36-A, 24-A2, and 36-A2, electrically controlled from a panel of push-buttons assure a steady volume of accurate work. Many features including automatic sizing, ammeters, wheel dressers, etc. are incorporated to increase output and decrease operator-fatigue. Bulletin No. 245-2RM giving full details and specifications is available from **Mattison Machine Works, Rockford, Ill.**

50. "Shield-Arc" SAE motor-driven



Taylor

HI-EFF

PRECISION
DRILLING
MACHINES

Always Look For The FACTS THAT *COUNT!*

Here are seven significant facts . . . They represent "HI-EFF" quality features for sensitive, precision drilling. Write for Bulletin 761.

1. Spindle and chuck run-out .0001.
2. Vaporized lubrication of bearings.
3. Spindle supported by 4 select, precision bearings —other moving parts precisely ground and lapped.
4. Solid column for maximum rigidity.
5. Variable speed—800 to 40,000 R.P.M.
6. Radial positioning of drill head.
7. Counter-balanced spindle affords sensitive feather-touch feed.

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Precision Drilling Machines

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welders provide exceptional range in currents for all types of welding work from thin metal to heavy plates and structures; available in 200, 300, 400, 600, and 900 ampere sizes. Bulletin 1302 describing and illustrating these welders also includes specification and dimensions table. Available upon request to **The Lincoln Electric Co., Cleveland 1, O.**

51. Hole Punching Units, type G for punchng holes in ½" thick mild steel are equipped with "Split Punches" which eliminates the tremendous stripping pressures and oversize stripping springs. Bulletin G illustrating and describing this equipment will be sent upon request to **Wales-Strippit Corp., 396 Payne Ave., N. Tonawanda, N. Y.**

52. "Balas Collets", a new catalog of collets, pushers, pads, and other machine tools accessories illustrates and describes the complete Balas line, also suggestions for use and application to various machine tools. Available from **Balas Collet Mfg. Co., 1561 E. 27th St., Cleveland 14, O.**

53. Vertical Hydro-Broach Machines, No. 1-30 single and ram type, are discussed in a new 11-page catalog, No. M-1706.



Ram ways hardened and ground and automatically lubricated extend productive life span of the machine. Various types of setups and production data are given. Free upon request to **The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.**

54. Standard Circular Form Tools perform many operations of correct dimensions, better finish and appearance, less set-up trouble and maximum production at low cost. Prices and specifications of these stock items, such as plain cut-off, face-off, crown cut-off tools, etc. are contained in a 4-page folder available from **Somma Tool Co., Inc., 19 Brown St., Waterbury, Conn.**

55. The Commander Tapper, capable of handling any tap from No. 0 to ¾", employs a spring clutch and an adjustable torque control which reduces tap breakage, and assures perfect threads. Leaflet fully describing this tapper may be secured from **Commander Mfg. Co., 4227 W. Kinzie, Chicago 24, Ill.**

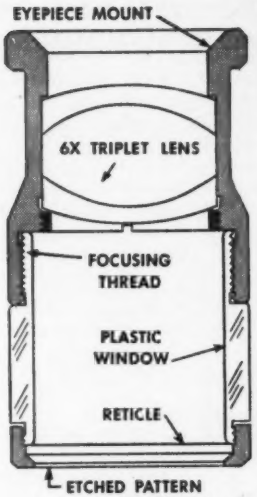
56. Ultra-Modern Foot Shears are illustrated and described in an 11-page bulletin 80F-A. Some of their exclusive fea-



New POCKET COMPARATOR

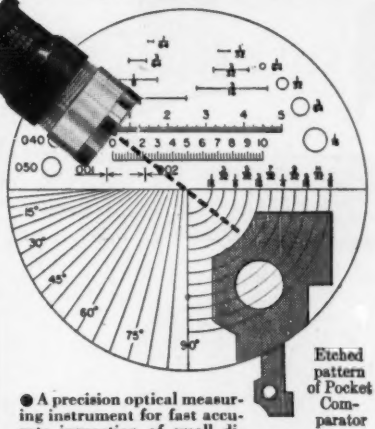
Pays for itself quickly inspecting small parts

PRICE $36.00



cross-section of Pocket Comparator (actual size)

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● A precision optical measuring instrument for fast accurate inspection of small dimensions. The pattern or reticle is calibrated for measuring lengths, widths, circles, radii and angles.

The Pocket Comparator is ideal for measuring wear on all types of cutting tools—pays for itself quickly by preventing premature regrinding of expensive tools. Use it, too, for checking forms and dimensions of punches, dies, gauges, templates as well as radii, angles, chamfers, threads and small holes on production parts. Order today.

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tures are: accurate cutting, unbreakable steel construction, quick-acting back gauge, and lifetime bronze crosshead ways and treadle bearings. Available upon request to **Niagara Machine & Tool Works, Buffalo 11, N. Y.**

57. Full-Automatic Lathe, model C, 1¼" x18", cam-operated, produces accurate production turning on centers at a profit. How it operates, sketches showing typical jobs, construction details, additional equipment, and specifications are contained in 7-page circular No. 492. Available from **Pratt & Whitney, W. Hartford 1, Conn.**

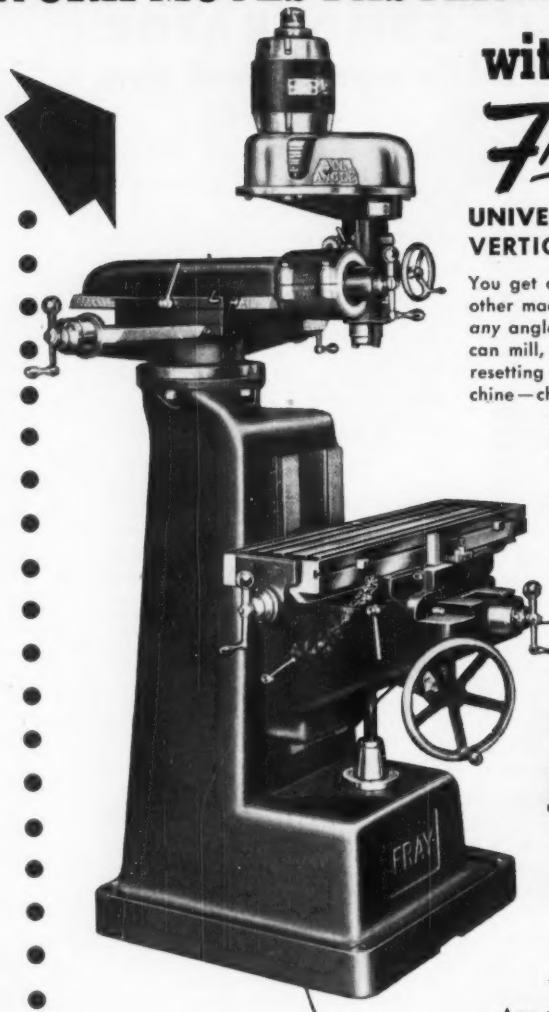
58. Spring-Master, new low cost spring making machine, produces precision springs. Infinite variation in pitch, length, and size, it's simple to set up and easy to operate. Raising or lowering of spindle controls pitch variations. New Coilmaster also shown on this 4-page circular available from **Cycloid Corp., Saugus, Mass.**

59. Metal Stripper N-165, a stripper for dissolving nickel from copper alloys, is fully described in a recent 4-page bulletin. Includes rate of stripping, how to make up the stripping solution, operation, prices, etc. Issued by **Enthone, Inc., New Haven, Conn.**

WORK MOVES FASTER and COSTS LESS with the NEW

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UNIVERSAL RAM Turret Type VERTICAL MILLING MACHINE



You get a wider work range than with any other machine this size. You can machine at any angle—vertical, horizontal or both. You can mill, drill or bore at any angle. Hence resetting isn't necessary. Just change the machine—changing is quick (For vertical and regular horizontal milling, use the 10-RH.) Jobs are done faster and better . . . at less cost.

- **It's Universal**
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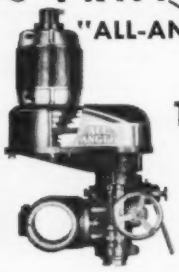
. . . a high precision tool

Write for details and specifications. Bulletin 10.

FRAY

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TYPE 4

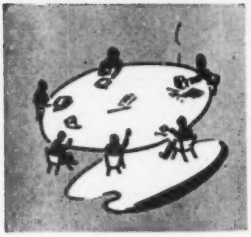


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MTBB
DECEMBER 1950

News of the Industry

N.M.T.B.A. ELECTS OFFICERS FOR 1950-1951 TERM

The 49th annual meeting of the National Machine Tool Builders' Association was held at the Royal York Hotel, Toronto, Ontario, on October 12, 1950. Richard E. LeBlond, president of The R. K. LeBlond Machine Tool Co., Cincinnati, Ohio, was elected as president of the organization.

Frederick S. Blackall, Jr., president and treasurer of The Taft-Peirce Manufacturing Co., Woonsocket, R. I., and Swan E. Bergstrom, vice-president of The Cincinnati Milling Machine Co., Cincinnati, Ohio, were elected first and second vice-presidents, respectively.

Jerome A. Raterman, president of The Monarch Machine Tool Co., Sidney, Ohio, was re-elected treasurer of the N.M.T.B.A. Tell Berna continues as general manager, and Mrs. Frida F. Selbert was again named secretary.

Three new directors were also elected, to serve three-year terms. They are Messrs. Bergstrom, Edward W. Miller, president of The Fellows Gear Shaper Co., Springfield, Vt., and Francis J. Trecker, president of Kearney & Trecker Corp., Milwaukee, Wis.

Ayr Opens Meeting with Defense Speech

The opening address of the 49th annual meeting of the National Machine Tool Builders' Association, held in Toronto, Ontario, on October 12, 1950, was delivered by David Ayr retiring president of the N.M.T.B.A., and president of The Hendey Machine Co., Torrington, Conn. His forceful speech was titled "Defense and the Machine Tool Industry." Mr. Ayr called



Richard E. LeBlond



Fred. S. Blackall, Jr.



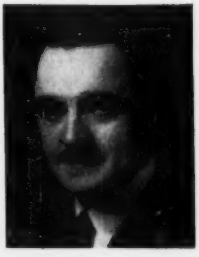
Swan E. Bergstrom



Jerome A. Raterman



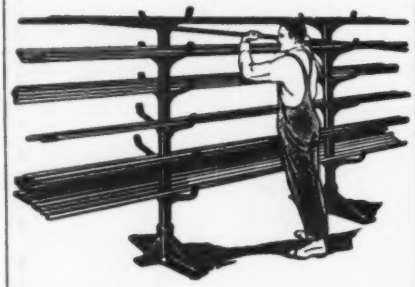
Edward W. Miller



Francis J. Trecker

SPEEDS UP STOCK-ROOM SERVICE

The BROWN TIME-SAVING RACK saves the time previously lost end-hauling each bar of stock its entire length from the old-style, closed-side Rack, the Brown Rack requiring but a few inches of side movement. Each length, width and thickness of stock is displayed in gold-fish visibility for instant selection. Workmen waiting for stock are served without waste of time, and returned to their production machines to turn out a maximum of output.



Any time you require additional storage space, all you need do is ot add more units. If you want to relocate it at any time, you can do so quickly for it is unattached to the building. It is a simple, durable article made of metal in five styles. It can't burn, warp, sag or twist; depreciation is practically nil.

SEND FOR BULLETIN No. 26-M DESCRIBING—

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the attention of the assembled manufacturers to the point that a year ago, the industry was concerned with the promotion of machine tool sales in a peacetime economy; today, a complete about-face has taken place, and many maufacturers find themselves in a situation similar to that which they faced during World War II, with new demands made upon them which approximate the requirements of a war production program.

The entry of the Unted States into the Korean war is held by many to be the underlying cause of this situation. But, according to Ayr, the more pertinent reason is that "the orders that came pouring in upon us were not war orders. They represented almost in their entirety replacements which manufacturers should have made long ago but which, because of Government depreciation policies and other factors, they had postponed. They were, you might say, practically on the table ready to be mailed when, if and as purchasers decided to do so. The Korean crisis served simply to precipitate the mailing."

In his subsequent remarks, Ayr emphasized the fact that the stimulus of military production has not as yet hit the machine tool industry hard. When the impact of the military demands do come, over and above the still-growing volume of business, this will be the problem which must be met.

The key to the situation, aceording to the speaker, lies in Washington. Said Mr Ayr: ". . . our big job today is in Washington. People we want to see won't see us; people we do see, won't understand; politicians will interfere with progress, and every day will bring some new baffle-ment and discouragement. But . . . we've got to take it . . . and keep right on working . . . We're down in Washington for just one reason—to do what we can to help things get done right. The basic question is not the protection of the interests of the machine tool industry, but the protection of our United States of America."

McDonald's Speech Accuses Administration

Some 300 members of the N.M.T.B.A., which represents over 90% of the American machine tool industry, attended the Fall meeting of the association, held at the Royal York Hotel, Toronto, Ontario. One of the key-note speeches was delivered by L. D. McDonald, chairman of the Committee on Government Relations of the N.M.T.B.A., and executive vice

president of The Warner and Swasey Co., Cleveland, Ohio. This address, entitled "Effect of Emergency Government on Machine Tool Builders" stated in part that the present administration in Washington is more concerned with the worthcoming November 7th election and the advancement of the cause of State Socialism than it is with the defense of the United States of America.

"The country's defense effort", McDonald said, "is today being jeopardized by the political maneuvering of the Truman Administration, which apparently is hoping to use the threat of war as a lever to transform our country from a republic into a socialized state.

"Politics remains the prize consideration —with the country paying the price in inflation, confusion, and unpreparedness."

According to McDonald, government bureaucrats were "concerned chiefly with the amount of tax revenue that government could extract from American industry to use for 'social' purposes . . . spreading the myth of social security, and undermining the faith of the American public in the integrity of American business."

"Let's assume, for a moment," McDonald stated, "that we remain victorious in Korea; that by the first of the year actual fighting is currently at an end, but our military production program is getting into full swing.

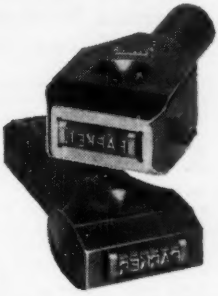
"If such should be the case, a victorious Democratic Administration, dominated by organized labor, could, under the cloak of military requirements, regiment this country into a strait-jacket from which we might never again emerge as a free economy.

"Our only protection against that lies today in the Congress and the Senate of the United States who, in my opinion, still have every intention to preserve our representative form of government."

The Franklin Hardware Co. of 50-52 Franklin St., New York, 13, N.Y. celebrates their 40th year in business this month. Both Andy Diehm and George Borst, the organizers, are still active and feel proud to have the good will of their customers as well as the friendship of the manufacturers who have been so cooperative and helpful.

Ace Drill Corporation, manufacturers of ground-from-the-solid drills and special tools has moved its plant and offices from Detroit to 2600 East Maumee Ave., Adrian, Mich. Their new plants more than doubles previous manufacturing area.

6 REASONS WHY IT PAYS TO USE Parker TYPE HOLDERS AND STEEL TYPE



Parker interchangeable type holders and steel type last longer — give sharper uniform impressions and give you these 6 extra features:

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PARTS FEEDERS



SYNTRON CO.
300 Lexington Ave. Homer City, Pa.

Control of the Columbia Machinery & Engineering Corp. of Hamilton, O., has recently been acquired by a New York interest.

The New Board of Directors are: James A. Walsh, chairman; Alfred Schwarzenbach, president of Schwarzenbach Huber Company; William F. Thompson, partner of Greene & Company, New York City; and Allan Merrill, of the Ford Motor Car Company. All Directors are now actively engaged in industry and finance.

John R. Queen, formerly of Allis-Chalmers Mfg. Co. of New York City, has been elected president to succeed James C. Hart. Other new officers are J. V. Delaney, treasurer, Lamar Jackson, secretary, and Paul G. Pater, assistant secretary.

The Capewell Mfg. Co. of Hartford, Conn., producer of hack and band saws, hammers, special nails and parachute hardware, has materially extended its

the "POCKET SIZE MACHINE SHOP"

DREMEL MODEL 2
MOTO-TOOL KIT



Moto-Tool Kit No. 2 contains 23 accessories, including **high speed steel** cutters and Model 2 Moto-Tool in natural finish hardwood case. $23.50

Moto-Tool No. 2, with one emery point. $16.50

Ford, Remington Arms, Westinghouse, Nash-Kelvinator, Douglas Aircraft and many other plants use Dremel Moto-Tools to speed up hand operations with resultant savings in labor, time and material. Moto-Tool has oil-sealed bearings for long life, dynamically balanced armature for vibrationless operation . . . delivers 27,000 r.p.m., yet weighs only 13 oz.

DREMEL MFG. CO., Dept. 221-M RACINE, WIS.

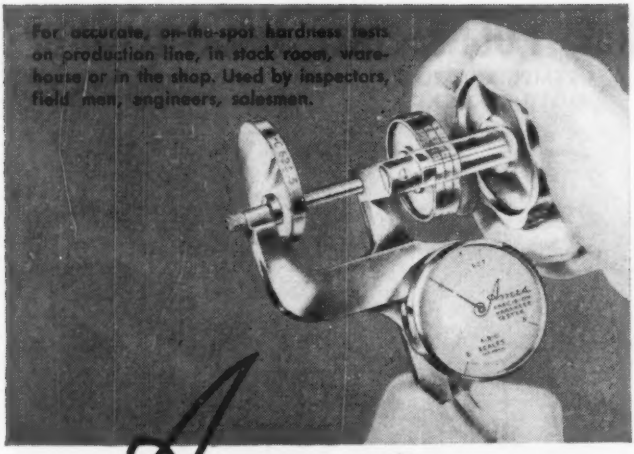
ELECTRIC DREMEL POWER TOOLS

IF YOUR MILL SUPPLY DEALER CANNOT SUPPLY YOU, WRITE THE FACTORY

line of products by the acquisition of V-Mac Industries, Inc. of Guilford, Conn., manufacturers of pipe threading, cutting and reaming tools. All the machinery and production facilities of V-Mac, and all of its employees are being retained and moved from Guilford to Hartford for continued full production in the 200,000 square foot Capewell plant. The transfer of manufacturing facilities will be complete by September 1st.

Supervision of the production of Capewell Pipe Tools will be in the hands of Mr. Waynard Vosper, for 18 years vice president of the Toledo Pipe Threading Machine Company in charge of the development, designing and production of Toledo pipe tools. More recently Mr. Vosper has been President of V-Mac.

Julian J. Behr Co., Cincinnati, advertising agency, has moved to new, larger offices 807-808 Ingalls Bldg., Fourth and Vine Sts., Cincinnati. The firm, established in 1911, consists of Julian J. Behr and Isidor Schifrin, partners. The firm specializes in industrial accounts.



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PORTABLE
HARDNESS TESTERS

Amazing savings in time and expense can be realized by taking the Ames Hardness Tester to the work. For hardness testing flat or round stock, tubing, duplicate parts, knives, saws and irregular shaped pieces, reading directly in the Rockwell Scales. No cutting off specimens. No laboratory delays. Complete with wooden carrying case. Several sizes. Write for bulletin.

AMES PRECISION MACHINE WORKS
Makers of Precision Bench Lathes & Milling Machines
WALTHAM 54, MASSACHUSETTS

The Aro Equipment Corp. has acquired the business and assets of The Taylor Machine Co., Cleveland, O. Aro aircraft accessories, formerly manufactured at the main plant in Bryan, Ohio, will be produced at the new plant to be known as The Aro Equipment Corporation Aircraft Division.

Mr. James P. Johnson, a former executive of Aro, has been re-named Vice President in charge of the Cleveland Aircraft Division. Mr. A. N. Abelson, formerly Works Manager in Cleveland, will resume his position there.

The Adamant Tool Co. of Bloomfield, N. J., will change its name to Wheel Trueing Tool Co. of N. J.

The Adamant Tool Co. was acquired by Wheel Trueing Tool Co. of Detroit in 1945 in order to provide industry on the eastern seaboard with manufacturing and distributing facilities comparable to those enjoyed by mid-continent industry through the Detroit plant. The success of this arrangement, and the growth in the distribution and use of Wheel Trueing industrial diamonds and diamond tools throughout the east, has indicated the

Faster, More Efficient Heat Treating

Quick Acting JOHNSON FURNACES



JOHNSON Hi-Speed No. 120

Treat high speed steels

Harden high carbon steels

Braze carbide tipped tools

$145.50 F.O.B. Factory

Compact, powerful, and remarkably economical in operation. JOHNSON Hi-Speed No. 120 reaches 1500°F. in 5 minutes. Delivers 2300°F. in 30 minutes. Easily regulated. Holds temperature at desired level for accurate heat-treating any steels. Ideal for small metal parts. Gets the job done fast to save time and gas. Firebox 5x7¾x13½. Complete with Carbofrax Hearth, G.E. Motor and Johnson Blower. Order Today.

There is a Quick-Acting JOHNSON Unit for every toolroom and shop

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570 E AVE. N.W., CEDAR RAPIDS, IOWA

SMOOTH AS A GUN BARREL!

Super Finish Bore on Universal Drill Bushings Lengthens Bushing Life, Reduces Tool Breakage



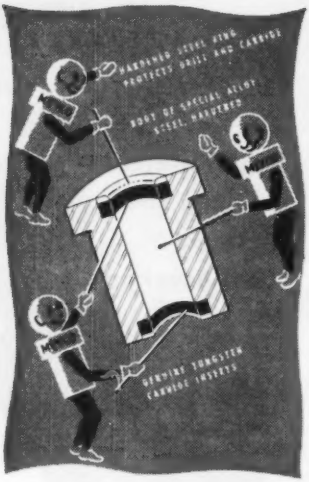
To super finish I. D., add such plus features as blended radius, knurled head, I. D. break, chamfered O. D., and you have the reasons why Universal Drill Bushings are specified by many of America's leading manufacturers. Universal provides extra prompt sectional delivery and information from warehouses at 1060 Broad Street, Newark, N. J., and 5035 Sixth Ave., Kenosha, Wis. Write, call or wire today!

UNIVERSAL ENGINEERING COMPANY

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THE FIRST NEW IDEA IN DRILL JIG BUSHINGS... SINCE HECTOR WAS A PUP!





MEYCO

Carbide Inserted Bushings

SAVE money 7 ways:

Talk about "earning their keep," look at the ways Meyco Carbide Inserted Drill Jig Bushings will save production costs: (1) Last longer . . . with a life—in most cases—as long as solid carbide bushings at prices that come close to the prices of ordinary steel bushings; (2) Increased life for your drill jigs and fixtures; (3) Increased life for your drills and reamers; (4) Accuracy maintained for a LONG PERIOD of time; (5) Less non-productive machine time, less lost man hours, because bushings need not be changed as often; (6) Inspection time saved, because of greater accuracy for a longer time; and (7) Less waste due to spoilage, for the same reason. MOTORMAKER SAYS: "High-Speed steel bushings averaged ten days' life, MEYCO bushings, after three months' use, show no signs of wear."

For information and prices write for Meyco Bushing Catalog No. 15.



W. F. MEYERS CO., INC., BEDFORD, INDIANA

desirability of establishing closer identification with the parent company through this change of name. Wheel Trueing Tool Company of New Jersey will continue under the direction of the present officers: Ed. W. Weimar, Jr., vice-president, and H. B. Ziegler, vice-president.

Gaston Power Tools, Harvey, Ill., manufacturers of heavy duty grinders and polishers for the metal working field, and producers of standby generators and concrete vibrators, has recently been sold by Ralph M. Gaston to new interests.

The new firm is known as Gaston Power Tools, Inc., and will continue operations at 14829 Loomis Street, Harvey, Ill., according to Arthur O. Backen the company's president.

The George L. Nankervis Co., engineers and manufacturers of plating, buffing, and metal finishing equipment, announces the purchase of the Electro-Mechanical Devices Company of Detroit, as a wholly owned subsidiary. Electro-Mechanical Devices Company (EMDCO) designs and builds dynamometers, control panels, test stands and special machinery and



2160 Holes *Per Hour!*

WITH SPECIAL

Atlas DRILL PRESS SET-UP

If you're looking for a fast way to drill small parts, it will pay to investigate Atlas Drill Presses. Atlas speed, ruggedness, accuracy, and all-around dependability team up efficiently with special fixtures for profitable production drilling.

For example, General Gas Light Co. of Kalamazoo, Mich., uses an Atlas Drill Press with automatic feeding device to drill 4 holes in brass valves at the rate of 9 pieces a minute — 2160 holes per hour!

A cam in the feed mechanism, designed by General, drives a rack which operates a pinion connected to the drill press feed spindle. In production, the operator simply positions the work — the Atlas and the automatic feed do all the rest. In another drilling operation, an Atlas with the same type automatic feed drills a $\frac{3}{8}$" hole, $1\frac{1}{4}$" deep, in brass at the rate of 660 per hour.

There may be dozens of such profitable uses for Atlas drill presses in your production. Send for a catalog today.



New Catalog
NOW AVAILABLE!
SEND FOR YOUR FREE COPY TODAY!

ATLAS PRESS CO.
1250 N. PITCHER ST.
KALAMAZOO, MICH.



products to serve the needs of the automotive and aircraft industries for production and quality control equipment.

The subsidiary company will be known as the Electro-Mechanical Devices Division of the George L. Nankervis Company.

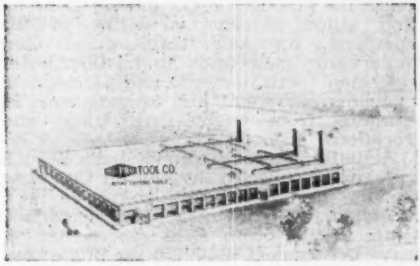
The two companies are consolidating their facilities in a new plant located at 19255 West Davison. The new building provides modern facilities for factory, research, engineering, executive and general offices.

The Wrentham Co., 23 Church Street, New Haven 10, Conn. have been appointed sales representatives in the New England States for Stadoil Manufacturing Co. to serve Mill Supply & Industrial jobbers in the New England States with Stadoil (Diamond Lapping Oil) Hone Rouge, Grind-All and Head Loose.

Hy-Pro Tool Co. of New Bedford, Mass., manufacturers of the nationally distributed line of HY-PRO taps, slotting saws, allied metal cutting tools, insert bits and holders, is now completely established in

its new large plant where full capacity operation has been reached to meet heavy production schedules.

Built from plans incorporating the latest developments in industrial construction, the extensive Hy-Pro plant contains every modern facility for maintaining high production, and provides ideal working conditions through the newest features of ventilation control, automatic air change, non-glare floodlighting, work-level conveyors, and numerous other modern



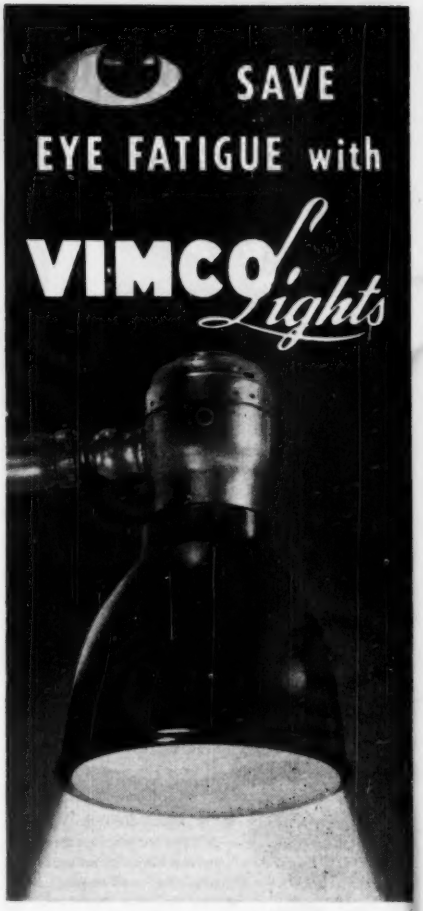
facilities for minimizing fatigue and increasing efficiency.

Double the size of its former quarters, the new plant of the Hy-Pro Tool Company, a subsidiary of Continental Screw Company, adjoins the large modern plant of its parent company in the Mt. Pleasant suburb of New Bedford, Mass.

Mid-West Abrasive Co.'s quantity production of a new, efficient abrasive grain for use in making grinding wheels and sandpapers will begin in its new plant at Owosso, Mich.

That portion of the plant expected to begin operations now will permit large grain, which heretofore has been produced on a small or experimental scale by the Mid-West laboratory. The completed plant will include highly modern equipment for crushing abrasive material from lumps or "nuggets" into grain of various sizes, ranging from extremely coarse to grain of powder-like fineness.

The new grain plant, measuring 342 feet long by 72 feet wide, and containing more than 100,000 square feet of floor space, was acquired by Mid-West Abrasive Company last year. When in full operation, it will supplement the company's main factory on South Washington Street, in which a major portion of the company's grinding wheels and sandpapers are manufactured. A third Mid-West plant, used exclusively to produce grinding wheels, is located at Rochester, Pennsylvania.



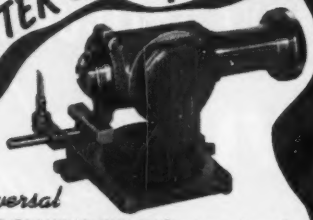
And when you prevent eye fatigue . . . you keep production up . . . you eliminate costly machine errors . . . and you help prevent personnel accidents. Remember, too, your customers expect your machines to be fully designed in every detail . . . that means they want the "on the point" lighting Vimcolights can provide. Vimcolights are easy to install, long lasting and backed by 30 years of specialized lighting experience.

Send for Bulletin 74

VIMCO MFG. CO., Inc.

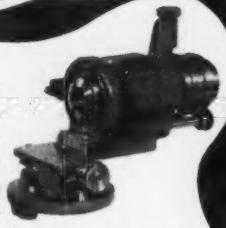
109 Brayton St. Buffalo, N.Y.

NOW! A LOW-COST CUTTER GRINDING FIXTURE



The *Universal*
CUTTER GRINDING FIXTURE fits any universal tool or surface grinder. The basic unit, shown here (standard accessories not shown), with its four attachments, below, provide a quick and accurate answer to nearly all cutter and tool grinding demands.

Precision BALL END MILL grinding is done with this compact, easily-operated fixture. An exceptionally flexible instrument, it grinds up to 2¼" dia., sets at any angles or radius with any cutting clearance on square, conical or ball nose shaped end mills.





◀ The MULTI-SWIVEL VISE attachment employs three swivels for quick set-up of any compound angle.
◀ This versatile INDEXING LOCK BRACKET may be set up in any position at either end of spindle housing on basic unit.
◀ For precision GRINDING WHEEL DRESSING this attachment will handle any two angles as well as set radius.

Send for descriptive literature.
Several good territories in U. S. and Canada are open to qualified representatives. Write:

ROCHELEAU TOOL AND DIE CO.
650A North Main St. Leominster, Mass.

Norton School of Grinding

Norton Company has a new fully equipped grinding school known as the "Norton School of Grinding."

Staffed by its own men who have been carefully selected for technical teaching and practical knowledge of grinding techniques, the school offers both the theoretical and the practical approaches to the uses of abrasives and the art of grinding.

Basically, the school is designed to teach the practical application of grinding and allied abrasive processes to the company's own sales trainees and plant supervisory personnel, to its distributor salesmen (both domestic and foreign), to customer personnel, and to instructors in grinding from engineering, trade, and vocational schools.

Actually, training courses have been a recognized necessity by Norton Company for the past fifty years and have been mandatory for its own sales personnel. Since 1900, Norton field representatives have been indoctrinated in the proper use of grinding wheels and the techniques of the various types of grinding.



Instructor J. Richard Leonard demonstrating cylindrical grinding and features of Norton 10" Type CTU Grinder to distributor trainees.

• • •

Delayed by World II, plans to broaden the training programs were started in 1947 when preparations were made for a more self-sufficient school. Grinding machines and grinding equipment, representing all major types of grinding, were laid out in addition to classrooms, conference rooms, offices, exhibits, an instrument room, stock room, and locker rooms. Even portable bleachers were designed for easy and effective observation by trainees of grinding demonstrations.

Thirty pieces of grinding equipment were required for the school's workshop:

production-precision machines for cylindrical, surface, centerless, internal, and tool and cutter grinding including the cemented carbides; cutting-off, lapping, polishing, and precision tumbling machines; and bench, floor, swing frame, and portable grinders for offhand work.

The department has been increased to six full-time personnel who carry out the administrative and basic training functions. This staff is supplemented by engineering, research, and service specialists from the company's several divisions. On occasion, Norton's advanced sales trainees themselves conduct grinding demonstrations in the school for visiting groups. As near individual instruction as possible is a major concern of this training school where every attempt is made to keep all classes to not over 12 trainees at any one time.

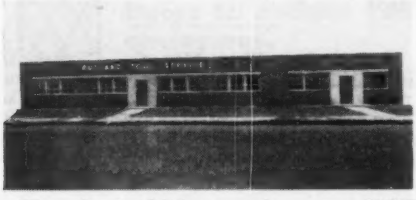
Depending on the requirement of the group or individual under instruction, courses range from one to fifty-five weeks.

During a typical year 150 distributors' salesmen and 100 customers' men will receive instruction in this school, plus about 10 Norton sales trainees.

Management responsibility for the new school comes under the guidance of Wallace T. Montague, vice president and manager of Business Planning and Development. Operating responsibility is under the direction of Robert W. Cornish, supervisor, Sales Training Department, and five associates: Kenneth L. Bates, William C. Davidson, J. Richard Leonard, Joseph A. Tatro, and Miss Annie M. Gaizetis, secretary.

Behr-Manning Corporation, Norton's coated abrasives (sandpaper) manufacturing division at Troy, New York, conducts a parallel activity in its own plant and has demonstration and service engineering shops in several large cities.

Rutland Tool Service of Detroit recently moved into their new plant at 1617 East McNichols Road, Detroit, Michigan.



The plant which comprises over 10,000 square feet of floor space is of modern one story construction and all machinery, electrical equipment, and air conditioning



Allison
COLLET CHUCK



NO STOPPING
NO KEYS
NO WRENCHES
NO PRODUCTION DELAYS

Meet sudden demands for high speed production by having every lathe equipped with the Allison Collet Chuck. Gives full spindle bore capacity to any lathe having 1½"-8 thread spindles. Requires no keys, wrenches, reverse switching or stopping. Operator simply draws lever ball toward him to tighten collet; pushes it away from him to release. Mail the coupon for complete, illustrated description and prices. INQUIRIES FROM MILL SUPPLY DEALERS AND DISTRIBUTORS INVITED. Use business stationery.

ALLISON CHUCK PRODUCTS
738 20th Street
San Pedro, California

Please send catalog page, prices and name of nearest supply house.

NAME_____

ADDRESS_____

CITY_____ STATE_____

M·B Model S-VT
18,000 RPM



"SPEE-DEE" Pneumatic
POLISHER

A development filling a distinct need. Produces remarkable results on real production work when abrasive rolls and pencils, also bands, etc., are used. Flexible air-control lever for starting and stopping. Husky, light weight, 14 oz. Power to spare. Special grease-sealed bearings. Will handle many applications, also with "High-Speed" Rotary Files.

•

Also "M-B"
PNEUMATIC
GRINDERS

•

Automatic AIR LINE FILTERS,
REGULATORS and LUBRICATORS

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"Remember, Built-In Quality Remains Long After First-Cost Disappears"

Representatives in Principal Cities

Write for Literature

M·B PRODUCTS
46 VICTOR AVE.
DETROIT 23, MICHIGAN

is of the latest type. A color conditioning plan was carried throughout the interior painting, resulting in the usage of twenty-seven different shades of paint.

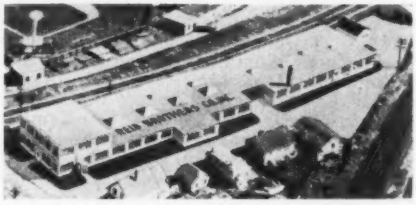
The plant is being used for the manufacture of special tools from standard tools, and the general reconditioning of all types of high speed and carbide cutting tools.

A portion of the building is occupied by the Detroit Office of the Union Twist Drill Company for their standard tool warehouse for the midwestern area.

Reid Bros. Celebrates

Reid Brothers Company, Inc., Beverly, Mass., celebrates fifty years of service to industry this year. Founded in 1900 by Robert and Andrew S. Reid, the company has grown from a small shop and today occupies a modern factory in the heart of industrial New England.

Well known throughout the world, the Reid Grinder, designed to handle work 6" wide by 18" long, is found in plants both large and small where fine grinding is desired.



The policy of constantly improving the products of Reid Brothers Company, Inc., as started by Robert and Andrew S. Reid, is being carried on today under the guidance of: Walter W. Perkins, president of Reid Brothers Co., Inc., Walter P. Fergnani, president of Post Machinery Co.; Thomas J. Toomey, treasurer; Robert F. Reid, assistant treasurer; John U. Reid, vice president; James Field, vice president.

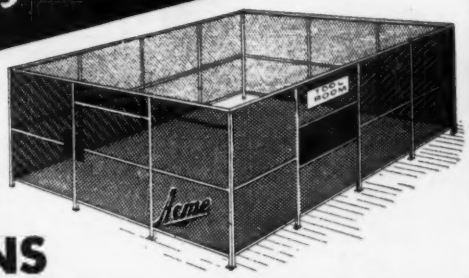
The Kirk & Blum Mfg. Co., Cincinnati, recently acquired the entire plant and property of The Cincinnati Planer Co. The plant, located at 3120 Forrer Street in suburban Oakley, will be occupied by Kirk & Blum about the end of the year.

Eight acres of ground surround the facilities, which include over 100,000 square feet of one story manufacturing and storage space, all under one roof, fronted by a two-story, air conditioned office and engineering building.

People Moving Up

Name	Company	To	Position
Dr. Kent R. Van Horn	Aluminum Co. of America, Pittsburgh	same	Associate Director of Research
Herman E. Bakken	Aluminum Ore Co., Pittsburgh	same	Vice President and Gen. Mgr.
R. H. Olson	Electric Mchy. Mfg. Co., Minneapolis	same	President
A. P. Burris	Electric Mchy. Mfg. Co., Minneapolis	same	Vice Pres. in charge of sales
Lawrence J. Kline	Automatic Transportation Co., Chicago	same	General Manager
Elmer F. Twyman	Yale & Towne Mfg. Co., Philadelphia	same	V-P. in charge of Phila. Div.
C. A. Huisemann	Goodyear Tire & Rubber Co., Aviation Prod. Div., Akron	same	Mgr. Indus. Brake Sales Dept.
Carl F. Schnuck	Farrel-Birmingham Co., Inc., Ansonia, Conn.	same	Director of Engineering
Warren C. Whittum	Farrel-Birmingham Co., Inc., Ansonia, Conn.	same	Chief Engineer
Gordon R. Anderson	Fairbanks, Morse & Co., Chicago	same	Gen. Mgr. Freeport, Ill. Wks.
Robert C. Medl	McCormack-Medl Corp.	Quaker Chem. Prod. Co., Conshohocken, Pa.	Technical Director
Houston E. Landis, Jr.	Air Reduction Sales Co.	Electrol, Inc., Kingston, N. Y.	Vice President
Donald E. Mason	The B. F. Goodrich Co.	Colonial Rubber Co., Ravenna, Ohio	General Sales Mgr.
J. William Schaeffer	Hunt-Spiller Mfg. Corp., Boston	same	Head of Standards Division
Robert A. Brown	Black & Decker Mfg. Co., Towson, Md.	same	Sales Engineer, Atlanta
William F. Dunn, Jr.	Black & Decker Mfg. Co., Towson, Md.	same	Sales Engineer, New Orleans
Robert Dawson	Black & Decker Mfg. Co., Towson, Md.	same	Sales Engineer, Kansas City
Frank W. Kabat	Physicists Research Co., Ann Arbor, Mich.	same	Head of Field Represent. Dept.
Arnold W. Lloyd	Physicists Research Co., Ann Arbor, Mich.	same	Field Representative
George Haber, Jr.	Physicists Research Co., Ann Arbor, Mich.	same	Field Representative

Leaders Over 50 years
Established 1899



TOOL CRIBS and PARTITIONS

Standard Sections Woven Wire Mesh Panels and Doors to enclose Tool Cribs, Stock rooms and other enclosures.

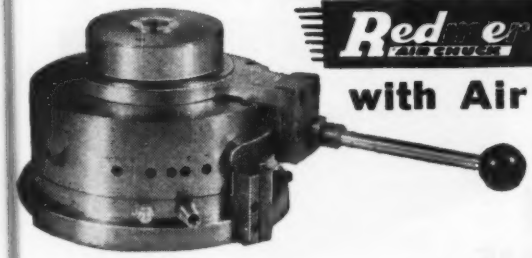
IMMEDIATE DELIVERY

Write for Catalog

Acme Wire & Iron Works

3519 E. CANFIELD — DETROIT 7, MICH.

Name	Company	To	Position
R. L. Peaslee	Wright Aeronautical Corp.	Wall Colmonoy Corp. Detroit	Development Engineer
Mert M. York	Allis Chalmers, Milwaukee,	same	Manager Boston District Office
Charles F. Stein	Kaiser-Frazer Corp.	Doehler-Jarvis Corp. New York	General Purchasing Agent
Allen P. Beckloff	Joseph T. Ryerson & Son, Inc., Chicago	same	Mgr. Tubular Products Div.
S. E. McCrum	Wickwire Spencer Steel Div.	Feedrail Corp., New York	Sales Promotion Manager
Harrison D. Beale	General Electric Co., Schenectady	same	Mgr. Renewal Parts Division
George Carleton, Jr.	Nice Ball Bearing Co., Phila.	same	President
Don C. Stahlein	K. O. Lee Co., Aberdeen, S. D.	same	General Sales Manager
C. S. Davis, Jr.	Borg-Warner Corp., Chicago	same	Pres. Norge Heat Div., Detroit
George T. Kearns	Kennametal, Inc., Latrobe, Pa.	same	Director
George G. Schuster	Kennametal, Inc., Latrobe, Pa.	same	Director
Royden C. Presley	Allegheny Ludlum Steel Corp., Pittsburgh	same	Dist. Sales Mgr., Birmingham
R. S. Koroneal	Hydraulic Equipment Co.	Cleve. Indust. Tool Corp., Cleve.	Sales Manager
John J. Dietz	Thomas A. Edison, Inc.	same	Chief Engineer, Instr. Div.
Joseph A. Garrett	Thomas A. Edison, Inc.	same	Asst. Chief Eng. Instr. Div.
John L. Busey	General Electric Supply Corp.	Gen. Elec. Co.	V-P in charge of marketing policy
Lewis W. Lammiman	The DeVilbiss Co., Toledo	same	Technical Service Manager
John W. Cochrun	Bendix-Westinghouse Automotive Air Brake Co.	The DeVilbiss Co. Toledo	Equipment Service Manager
John F. Myers	Westinghouse Elec. Supply Co. New York	same	President
Raymond F. Jalbert	Taft-Peirce Mfg. Co., Woonsocket, R. I.	same	Manager Detroit Sales Office
W. C. Schofield	Ward Leonard Electric Co., Mt. Vernon	same	Assistant Sales Manager
R. G. Brierley	Carboloy Co., Inc., Detroit	same	Manager of Training
George I. Bottcher	Allegheny Ludlum Steel Corp., Pittsburgh	same	Chief Engineer
H. Campbell Stuckeman	Delta Pwr Tool Div., Rockwell Mfg. Co., Milwaukee, Wis.	same	Vice Pres. in charge of Sales and Operations
Harold C. Hjerpe	Delta Pwr Tool Div., Rockwell Mfg. Co., Milwaukee, Wis.	same	Gen. Mgr. Delta Mfg. Division



RC-5

Redmer AIR CHUCK

Index Chuck with Air Operated Collet

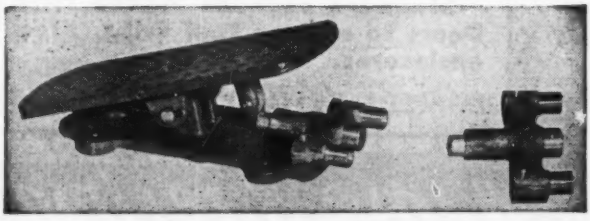
The REDMER INDEX CHUCK has twelve indexing positions and Collet capacity 1/16" to 2". REDMER CHUCK can be had with either Index Collets or Standard Brown & Sharpe type collets.

No. FC-28

V-29

Air Foot Control and Valve

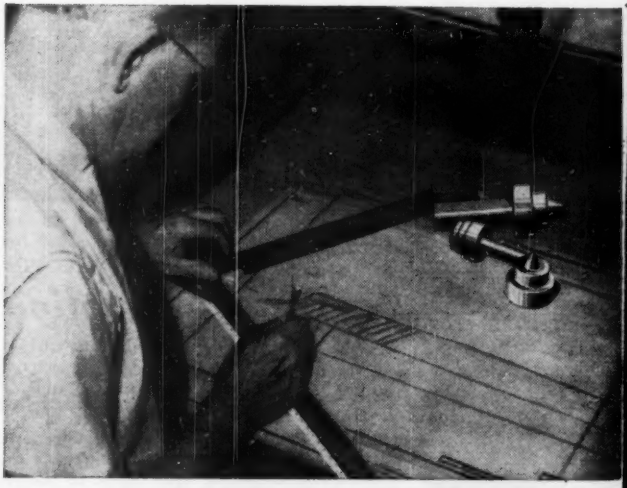
The REDMER FOOT CONTROL & VALVE was developed in order to meet a demand for an AIR VALVE & FOOT CONTROL LOW IN COST but constructed to surpass the high priced Valves.



REDMER AIR DEVICE CORP.

GUNTERSVILLE, ALABAMA, BOX 247

Name	Company	To	Position
F. F. Roehll	Eutectic Welding Alloys Corp., New York	same	National Sales Manager
Harlow F. St.' Pierre	Hunt-Spiller Mfg. Corp., Boston	same	Mgr. of Indus. Castings Sales
Louis R. Botsai	Westinghouse Electric Corp., Pittsburgh	same	Mgr. Motor & Control Div., Buffalo
Dr. L. P. Seyb	Diamond Alkali Co., Cleveland	same	Manager of Research
D. J. Richards	E. F. Houghton & Co., Philadelphia	same	Head of Domestic & Foreign Sales
George Eldred	Micromatic Hone Corp., Detroit	same	Abrasive Sales Manager
Charles W. Bryan, Jr.	Federal Shipbuilding & Dry Dock Co.	Pullman-Standard Car Mfg. Co.	President
Norman F. Smith	The DeVilbiss Co., Toledo	same	Plant Superintendent
Kenneth R. Beardslee	Carboloy Co., Inc., Detroit	same	President
Eugene F. Wambold	Carboloy Co., Inc., Detroit	same	Vice Pres. in charge of Mfg.
Austin Cunningham	Thomas A. Edison, Inc., W. Orange, N. J.	same	Asst. Mgr. Ediphone Division
Charles T. Jacobs	Thomas A. Edison, Inc., W. Orange, N. J.	same	Vice Pres., Mgr. Ediphone Div.
Nils Walter Swenson	U. S. Rubber Co., New York	same	Asst. Mgr. Branch Sales, Mechanical Goods Division
Dr. Max T. Goebel	E. I. DuPont de Nemours & Co., Wilmington, Dela.	same	Asst. Tech. Dir. Grasselli Chem. Dept.
George H. McBride	Westinghouse Electric Corp., Pittsburgh	same	Mgr. Gearing Division
J. Nail Candler	Morse Chain Co., Div. Borg-Warner Corp.	same	Administrative Asst. to Pres.
Beaman H. Ayers	The National Acme Co., Cleveland	same	Vice Pres. and Works Mgr.
John L. Molner	The National Acme Co., Cleveland	same	General Superintendent
Everett M. Hicks	Norton Company, Worcester, Mass.	same	Mgr. Grinding Mach. Division
Francis I. Taylor, Jr.	Hunt-Spiller Mfg. Corp., Boston	same	Sales & Eng. Representative



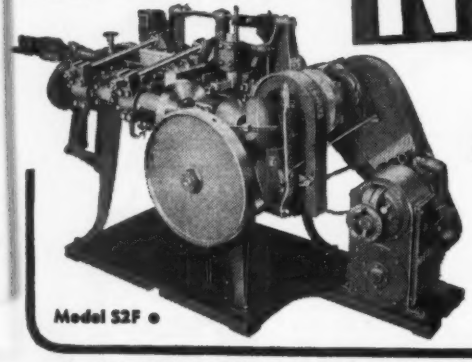
Engineered Live Centers . . . A properly designed Live Center is one of the fundamentals of setting up a job and requires a specialist's experience. Characteristic of the design of all STURDIMATIC LIVE CENTERS is a low overhang and a slight cushioning action that compensates for expansion due to heat shock and excessive thrust loads—reducing wear to a minimum. Send us your blueprints and specifications—we will see that your job is set up with the right Live Center. Standard shanks with Morse taper carried in stock.

STURDIMATIC TOOL COMPANY

3302 E. STREET • DETROIT 16, MICH.

Name	Company	To	Position
A. Paul Selby	U. S. Steel Corp. of Delaware	same	Asst. to Sales Vice Pres.
Leonard J. Maguire	Fairbanks Morse & Co., St. Johnsbury, Vt.	same	Works Mgr., scale plant
Milton L. Weislogel	Carnegie-Illinois Steel Corp., Gary	same	Asst. to General Supt.
Frank A. Kelly	Carnegie-Illinois Steel Corp., Gary	same	Plant Industrial Engineer
William J. McKee	National Tube Co., Pittsburgh	same	Gen'l. Manager of Sales
Louis W. Mason	same	same	Sales Mgr., Central Area
Robert E. LaBonde	R. K. LeBlond Machine Tool Co., Cinc.	same	Advtg. & Export Manager
Floyd Monteith	Kennametal, Inc., Latrobe, Pa.	same	Chicago Representative
Robert Karakoosh	Kennametal, Inc., Latrobe, Pa.	same	Springfield Representative
Louis DeMarco	Firth Sterling Steel & Carbide Corp., McKeesport, Pa.	same	Sales Engineer, Carbide Div.
Douglas A. Kuhns	J. N. Fauver Co., Inc., Detroit	same	Chief Engineer
George F. Brobyn	SKF Industries, Philadelphia	same	Night Supt. main plant
D. C. Miner	E. F. Houghton & Co., Philadelphia	same	Director
William K. Barclay, Jr.	E. F Houghton & Co., Philadelphia	same	Director
Dr. Robert H. Steiner	Firestone Tire & Rubber Co.	Atlas Mineral Prod. Co., Merztown, Pa.	Research Coordinator
Chester M. Adams	Kennametal, Inc., Latrobe Pa.	Crobalt, Inc. Ann Arbor, Mich.	Vice Pres. in charge of produc.
J. E. Weldy	Carboloy Co., Inc., Detroit	same	Marketing Manager
J. S. Gillespie	Carboloy Co., Inc., Detroit	same	Product Sales Manager
J. M. Bertatti	Carboloy Co., Inc., Detroit	same	Field Sales Manager
Roger S. Ahlbrandt	Allegheny Ludlum Steel Corp., Pittsburgh	same	Mgr. Stainless Steel Bar Sales
I. R. Lohany	Allegheny Ludlum Steel Corp., Pittsburgh	same	Asst. Mgr. Cutting Tool Sales
E. A. Henry	Keystone Steel & Wire Co., Peoria	Firth Sterling Steel & Carbide	Wire Die Specialist, Chicago Plant
R. D. Brooks	Firth Sterling Steel & Carbide Corp. McKeesport, Pa.	same	Woodworking Development Eng. Carbide Div.
F. Joseph McKay	Follansbee Steel Co.	Firth Sterling Steel & Carbide	Director of Industrial Relations

There's Nothing like a NILSON



Model S2F •

For Rapid Production

• **Combination Press and 4-Slide Forming Machine**

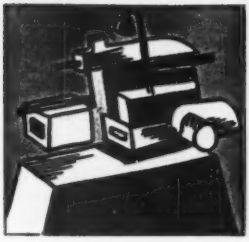
Extra rigid construction; tooling costs are generally lower; forming tools are interchangeable and easy to adjust. Send for catalog.

A. H. NILSON MACHINE CO.

BRIDGEPORT 5, CONN.

Automatic Wire and Metal Forming Machines • Staple Forming Machines • Chain Making Machinery • Foot and Power Presses • Wire Reels • Wire Straighteners.

SPECIALISTS IN WIRE FORMING EQUIPMENT FOR OVER 50 YEARS



MTBB
DECEMBER 1950

Modern Tools in Action

Press Brake Ups Production

The operation time for punching Support Angles for the American Dustube Dust Collector was reduced from 6.0 minute per piece to 1.2 minute per piece through the application of a press brake at the Mishawaka, Ind., plant of The American Wheelabrator & Equipment Co.

This machine is equipped with a special multiple punching setup that eliminates the necessity of layout and replaces a single punch operation, resulting in huge saving in the punching time on support angles, support channels, side angles and truss braces for American dust collectors. The holes had to be laid out previously by hand with a template, then punched one at a time. Now, the press brake is set up, the L-angles and channels are placed in the machine, and all holes in a side are punched at one time. Layout is completely eliminated on these pieces.

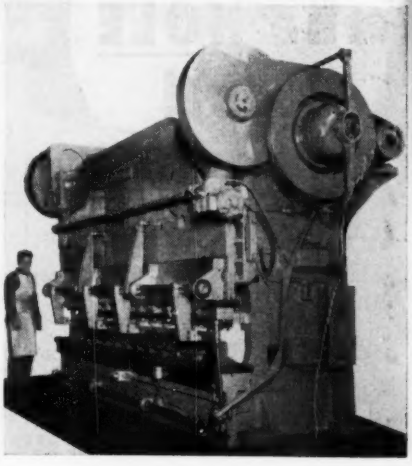
The punching equipment includes two sets of interchangeable punching blocks and covers the entire range of channels and angles. This includes structural channels from 3"-4.1 lbs. to 8"-11.5 lbs., and structural angles to 5" x 5" x ⅜". The maximum hole diameter is 1-3/16". The equipment is arranged to punch either leg of the angles and both the web and flange of channels. The punches are provided with fixed strippers.

The equipment shown on the front of the machine is special pneumatic clamping equipment. Two air cylinders are attached to the ram of the press brake and with the machine at the top of the stroke the clamp is in the "Out" position. As the ram moves down, the air pistons rotate the clamp which automatically holds the angles and channels securely to the punching blocks.

The punching bolsters are kept in alignment by means of two leader pin sets, so that the equipment can be quickly placed into the press brake or removed to make the brake available for regular bending and forming work. The machine is a 120 Series x 12' Cincinnati, made by the Cincinnati Shaper Co., Cincinnati, Ohio.

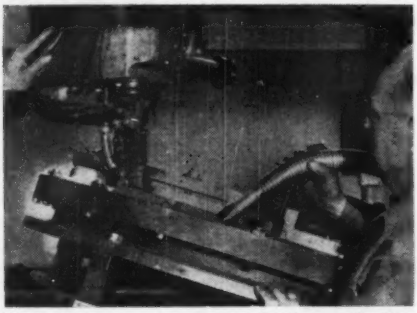
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Punching support angles for a dust collector. Time was reduced from 6.0 minute per piece to 1.2 minute per piece.



Automatic Welding of 18-8 Stainless

To fabricate J47 turbo-jet components at high production speeds and with uniformly good quality welds, the Solar Aircraft Co. of San Diego,



Turbo-jet components at high production speeds utilize automatic hidden arc welding.

• • •

Cal., has set up a production line in which automatic hidden arc welding is used. The 18-8 stainless steel parts are welded with a standard automatic head manufactured by The Lincoln Electric Co. of Cleveland, O., using an 18-8 type filler wire.

Excellent results are obtained with the welding technique worked out, involving rigidly controlled high heat inputs and rigid fixtures to maintain accurate alignment of parts. The fixture is mounted on a rotating positioner which revolves the work under the welding head.

Production Bending Cuts Costs

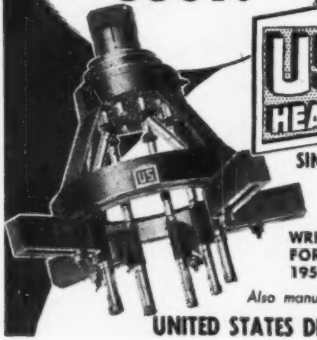
Many tube and bar bending jobs, previously formed with hand-operated or obsolete equipment are today being handled on Production Bending Machines at speeds that result in substantial savings in costs.

A typical example is one illustrated here, employed by a plumbing fixture manufacturer. On this job, drain traps for sinks are formed automatically with two 180 degree bends on a Pines Size ¾ Production Bending Machine. The tubing is 1½" brass of .032" wall thickness. The stock is precut to a developed

Figure the HOLE Cost!

ADJUSTABLE MULTIPLE DRILL HEADS

Fit any machine, 2 to 10 Spindles. Save 2 to 10 Operations



US HEADS
SINCE 1915

PRICES: 6" DRILLING AREA
1/4 capacity, 21/32 center

U-1	3	Spindle Head,	$190	U-1	6	Spindle Head,	$215
	4	" "	198		7	" "	228
	5	" "	203		8	" "	254

PRICES: 10" DRILLING AREA
1/2 capacity in cast iron standard
3/4 special adaption in cast iron

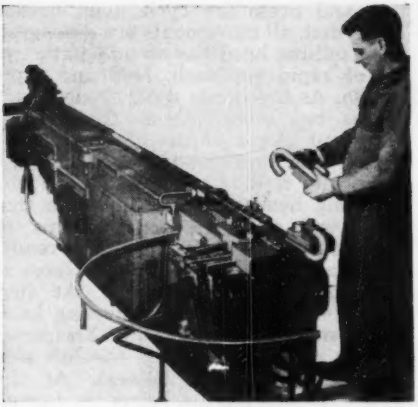
U-2	3	Spindle Head,	$246	U-2	7	Spindle Head,	$383
	4	" "	280		8	" "	418
	5	" "	315		9	" "	453
	6	" "	349		10	" "	487

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IMMEDIATE DELIVERY

Also manufacturer of all types of fixed center and individual lead screw tapping heads.

UNITED STATES DRILL HEAD CO., Dept. D 616-18 Burns St., Cincinnati 4, O.



Drain traps for sinks are formed automatically with two 180 degree bends.

• • •

length suitable for two finished traps. It is then loaded into the machine by an operator who simply touches a push-button control to set the machine to work. After the first bend, the piece is turned and the second bend completed in the same manner.

The machine, which is electrically controlled and hydraulically operated, has made it possible to step up production to a rate of between 400 to 500 bends per hour. This is 2½ times more production than was formerly possible with previous equipment. Prior production was less than 175 bends per hour.

In addition to the increased production, improved tool design for the bending of sink trap tubing contributes a greater accuracy and improved quality with reduced maintenance cost due principally to the improved flexible mandrel design. Nested ball segments prevent excessive breakage of balls and links and resulting production interruptions.

Of special interest to fabricators, is the fact that this type of equipment is readily adaptable to not only round tubing and bars but also to rectangular and square stock, and rolled or extruded sections. The machine is also highly versatile and can be quickly changed over and profitably adapted to a wide variety of work including ser-

bend pipe by hand or power with "American"

Cold Pipe, Conduit and Heavy Wall Tube

BENDING MACHINES

Fast...Simple...Dependable

RADIANT HEAT BENDS

in Standard Pipe



Hand-Powered "American" A-30 Fast . . . Accurate . . . Average bend takes only 10 seconds! Up to 180° bends . . . all sizes from ½" to 2". Usual radiant heat bends for 1¼" at 6" and 9" radii can be supplied. Only 7 parts. Standard radius 5 times pipe size. Occupies 18" x 18" floor space.



Motor-Powered "American" 2PB Capacity ½" to 2" standard pipe . . . Standard radius 5 times pipe diameter up to 180° . . . Maximum radius 13". Complete with rolls for each size pipe. Standard motor equipment 2 h.p.

Special radii supplied on request

"American" PIPE BENDING MACHINE Company

Factory and Main Offices: 9 Furnace St., Poultney, Vt.

pentine, stacked coil, compound and multiple bends. A heavy cast-steel nose, alloy steel spindle, adjustable gibs, and Timken bearings are a part of the machine's design that assures long operating accuracy with little maintenance expense. In addition, hydraulic controls are panel mounted for easy accessibility.

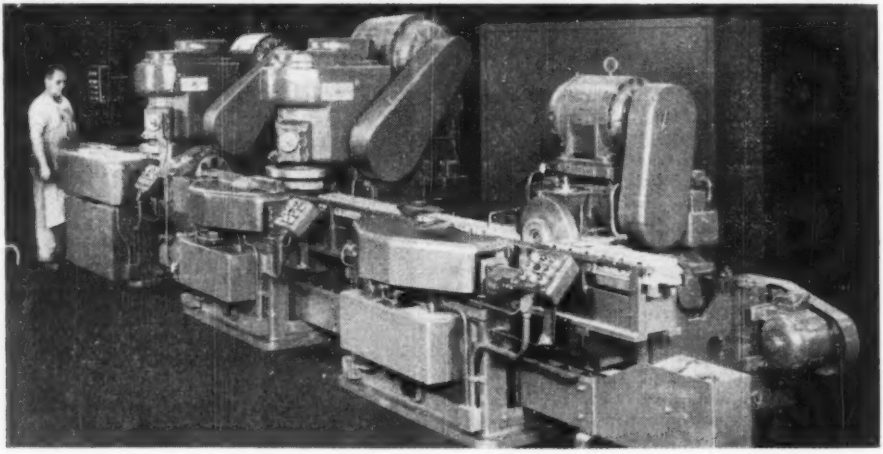
Automatic Transfer Machine Mills Cylinder Heads

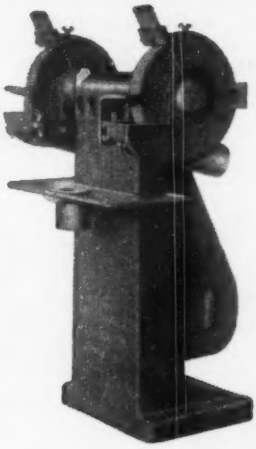
Automatic Transfer-type Rigidmil built by the Sundstrand Machine Tool Co. of Rockford, Ill., mills the top, bottom and both sides of cylinder heads. The machine consists of three milling stations, one turn-over station, an idle station and loading and unloading stations. All stations can be controlled from the master control button panel or individually from the station button control panels. The cylinder heads are shuttled from station to station by the return movement of the milling heads, making it unnecessary to have a separate shuttling device. A motor driven chip conveyor removes the chips from the machine.

The operator needs only to locate the cylinder heads on the loading station and press the cycle start button. After that, all movements are automatic. Each milling head has an automatic cycle of rapid approach, feed and rapid return. As the heads rapid return, each moves two work pieces—the finished piece out ahead of the cutter, making cutter relief unnecessary; and a rough piece into milling position. All of the traveling heads are intertimed so that none will start the rapid return or shuttling movement until all are ready, thus making a pile-up of work pieces at any one station impossible. At first milling station, a 25 HP traveling head with one vertical and one horizontal spindle mills the top and the left side (accessory mounting bosses). At the turn-over station, the piece is turned 180°, making the bottom side up. At the next milling station, a 40 HP traveling head with one vertical spindle, mills the bottom (contact face) of the cylinder head. From the second milling operation, the piece goes into an idle station. This station is necessary to allow room for movement of the two traveling heads on either side. The last milling station has a 15 HP traveling head with one horizontal spindle that mills the right side (manifold face). Now with all four sides milled, the

• • •

Automatic transfer-type Rigidmill mills the top, bottom and both sides of cylinder heads.





"PIGS IS PIGS" does not apply to GRINDERS!

There are two general types of Grinders (we make both)—the familiar direct drive with motor on top of pedestal and wheels directly on shaft, which is perfectly satisfactory for numerous applications.

But for highest production and lowest wheel cost, the HISEY TexDrive Grinder is a must. Consider the facts (1) wheels must operate at correct speed for quickest metal removal; (2) under speeded wheels wear faster; (3) A.C. Motor speeds are limited—900, 1200, 1800 and 3600 R.P.M.

The HISEY TexDrive Grinder has motor mounted on rear of pedestal and V-belt drive to spindle affords correct speed for any size or bond wheel—hence, highest production, longest wheel life.

The absence of the bulky motor between wheels also increases freedom of operation. Larger machines have multiple speeds to compensate for wheel wear.

If you have production grinding operations, it will pay you to investigate.

ASK FOR COMPLETE CATALOG 71-BE.

THE HISEY-WOLF MACHINE CO.
CINCINNATI 8, OHIO
Division of The Cincinnati Electrical Tool Co.

piece moves onto the unloading station and the outgoing conveyor. A safety switch at this station prevents another cycle of operation until the finished piece has been removed.

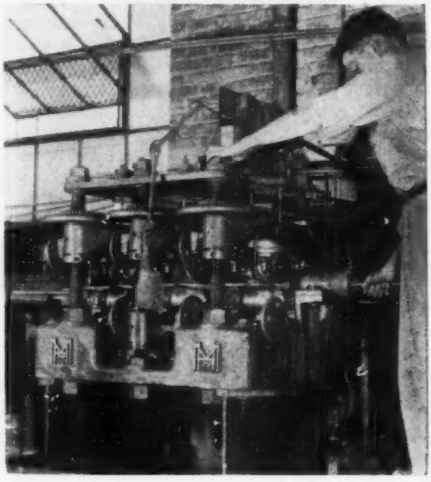
Straightening Stainless Tubing

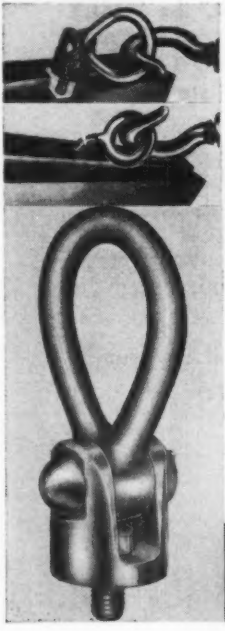
Straightening stainless steel, nickel and nickel-alloy seamless tubing to achieve a tolerance of .020 in. per ft. is accomplished by this rotary straightener in the Malvern, Pa., plant of J. Bishop & Company Platinum Works.

Tubing ranging in size from 1½ in. down to ¼ in. comes to this Mackintosh-Hemphill machine after drawing, bright or open air annealing, and pickling. The last draw to specified size causes each length of non-ferrous tube to take a "set" or a "bow". Deformation of the tubing back to perfect straightness is essential in order to meet rigid specifications of tubing fabricators.

Operated more than 11 hours out of each 16-hour day since 1945, former down-time for retooling has been eliminated and only minimum maintenance is required.

Running at one-half rated speed, the rotary straightener assures roundness and an unmarked surface of tubing passed between its six guideless crossed rolls. Tubing walls are as thin as .010 in. on 1¼ in. O. D. tube; .003 on ¼ and 5/16 in. tube, and .005 on ½ in. O. D. non-ferrous tubing.





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NOT A MERE EYE BOLT — BUT A NECESSARY TOOL

Has a perfect self load centering action which provides true alignment of load. Eliminates bolt thread straining and breaking off.

- provides greater safety for your men and saves valuable time.
- Prevents costly damage to Machinery, Dies, Tools, Etc., caused by standard eye bolts shearing off.
- Built to last a lifetime.
- Made of high grade steel . . . whose ductility and toughness is greater than ordinary Commercial Steel . . . therefore, Schaffer Eye Bolts can be subjected to heavy intermittent jerks and strains.
- Thousands in use in all industries.

STOCK ITEMS

½" to ⅝"—$11.75 each,
¾"—$13.50 each,
⅞" to 1"—$23.50 each

Specials on quotation.
When ordering specify amount and bolt thread size.

S. S. SCHAFFER CO.
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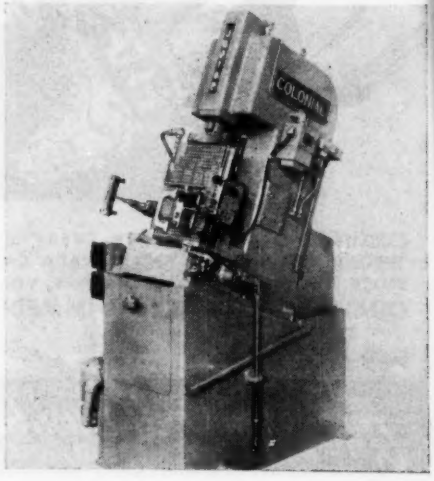


Ingenious Broaching Set-up

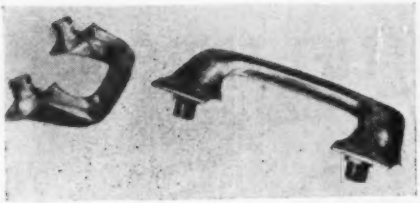
Easier loading and an unusually high degree of operator safety was obtained in the broaching setup for rocker type automotive door handles. The equipment consists of a standard bench type Colonial "Junior" hydraulic 2-ton, 12-inch stroke press mounted at an angle on a special fabricated base. A hinged guard screen covers the broaches during loading as well as during the machine cycle, the handles being inserted into broaching position through holes in the screen. Thus the operator's hands cannot come in contact with the broaches during machine operation.

The inclined angle of the press facilitates loading and also makes it possible to use the weight of the door handles to hold the parts in position until the quick acting toggle clamps are swung in place, thus further simplifying the

• • •



Press is placed on an inclined base for loading convenience and operator safety. Moving parts are covered by a guard. Both ends of automotive door handles are broached two at a time, being clamped in place by the simple swinging arm fixtures.



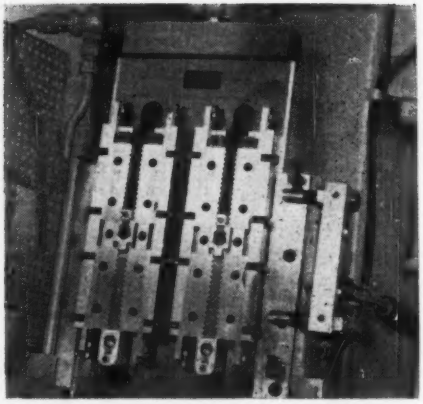
Close-up of "rocker type" automotive door handles. An unbroached handle is shown at the right; finished part at the left.

• • •

job of loading and decreasing floor-to-floor time.

In addition to broaching two door handles at a time, side by side, the setup is such that it also broaches both ends of the handles simultaneously. This is made possible, in so short a stroke, by using separate sets of broaches—one above the other—for each end of each handle.

In order to make it unnecessary for the operator to swing the screen back, even for cleaning out of chips, an air



Close-up of the tooling set-up with guard removed showing fixtures, loading pockets, broach inserts, etc.

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blast is provided, operated from a convenient manual control at the front of the machine.

A neat idea is also included in the

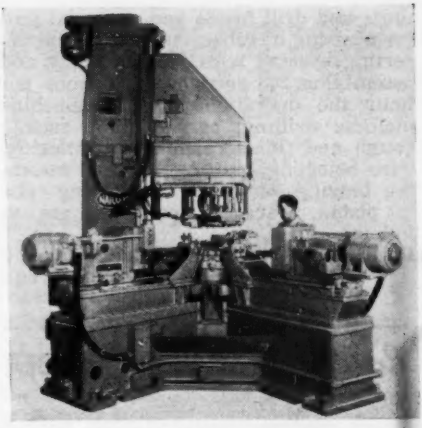


coolant piping. The coolant nozzles are semi-permanently attached to the guard screen and connected to the piping with a ball joint in line with the screen hinges. Thus the nozzles always stay correctly aimed and yet can be swung back out of the way with the guard screen during setup after broach sharpening.

An electrical interlock prevents return of the broaches to starting position until finished parts have been removed at the end of the cutting stroke, thus avoiding possible damage to the broach teeth. The unit was engineered by the Colonial Broach Co.

Machines and Assembles Refrigerator Pistons

A new four-way horizontal drilling machine manufacturel by the National Automatic Tool Co. of Richmond, Ind., **machines and assembles 248 refrigerator pistons per hour.** The Natco Holesteel machine is made up on one vertical unit and head with standard column-wide ways; left front and rear horizontal



This four-way machine assembles and machines 248 refrigerator pistons per hour. Finish turning to 30 Microinches rms surface smoothness eliminates grinding operation.

• • •

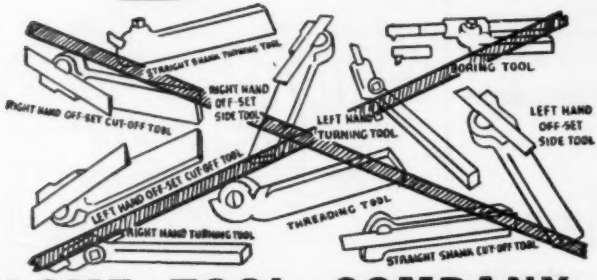


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ONE tool holder for all positions . . . No tool chatter . . . can do internal boring or internal threading . . . Ideal for carbide tools . . . Bit sizes: 1/4", 5/16", 3/8", 7/16".

ACME TOOL COMPANY

71 WEST BROADWAY
NEW YORK 7, N.Y.

units and drill heads and a special unit for pressing in tubes, cutting off and inserting brazing wire. In machining and assembling 248 refrigerator pistons per hour the operations of this machine include: drilling; core-drilling; facing; rough and finish reaming; chamfering; wire-brushing; cutting off and inserting brazing wire; and assembling tube in piston. Detailed operations are as follows:

Position No. 1 — Remove and load 2 parts with open end out

Position No. 2 — **Vertical Head**
Drill ½" dia. for .766" ream—2 walls

Position No. 3 — **Vertical Head**
Core drill for .766" ream — 2 walls

— 2 walls **Horizontal Head**
face open end

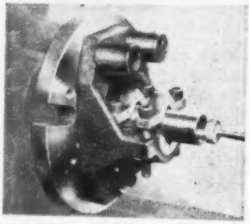
Position No. 4 — **Vertical Head**
Rough ream for .766" ream — 2 walls

Position No. 5 — **Vertical Head**
Idle
Horizontal Head
Chamfer I.D. and O.D. of open end and ream 15/16"
Vertical Head
Finish ream .766" dia. tube hole

Position No. 7 — **Vertical Head**
Wire brush tube hole
Horizontal Head
Blow chips

Position No. 8 — **Vertical Head**
Idle
Horizontal Head
Cut off and insert brazing wire.
Vertical Head
Press in tube

Lassy **WORK HOLDER**



Quick, accurate setups on Lathes, Grinders, Jig Borers, Milling Machines and Drill Presses. Accurate to .0002 in 3" Hardened steel "V" insert. Also made with quick acting clamps for production work.

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New features for automatic operation on millers and drill presses. Length of movement controlled. Change 24 stations. Write today for complete data . . . It's free!

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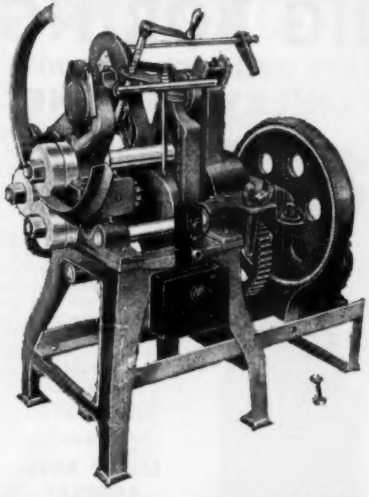
Manufacturers of
Precision Machinery and Machine Parts
Roller Bearing Twister Spindles—Spindle Oiling Machine
Precision Internal Grinder—Screw Machine Products

THE NEW REVERSIBLE
EXCELSIOR CIRCULAR BENDING MACHINE No. 14-R

ROLLS PART OR COMPLETE CIRCLES

PRODUCTION
CIRCULAR BENDING
OF
ANGLES, FLATS, PIPES, ROUNDS, SQUARES, TEES, CHANNELS
AND
VARIOUS CROSS SECTIONS

FINGER-TIP
PUSH BUTTON
CONTROLS FOR FORWARD, REVERSE AND INCHING MOVEMENT OF ROLLS OR STOP



EXCELSIOR TOOL & MACHINE COMPANY, EAST ST. LOUIS, ILLINOIS

FISHER BENDER



This sturdy, hand-power bender will bend up to:

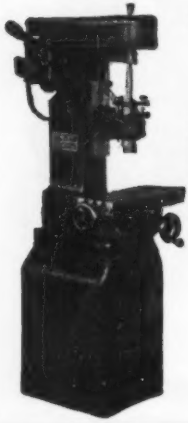
½" square or round iron
2"x½" channel iron
2¼"x$\frac{5}{16}$" flat iron cold

Weight: 40 lbs. **Immediate Shipment**

New circulars covering our line of benders, cutters, and punches available.

T. H. LEWTHWAITE MACHINE CO.
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JIG BORING
PUT SMALL JOBS ON THIS
LINLEY MACHINE



and save your larger machines for heavier work.

YOU'LL BE SURPRISED!

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New Books

Kent's Mechanical Engineers' Handbook—Power Volume

By J. Kenneth Salisbury. Published by John Wiley & Sons, Inc., New York. 1950, $8.50. Twelfth Edition.

In this volume the entire field of heat-power engineering and transportation is covered as well as the important aspects of fluid flow. With the addition of new subject matter, the size of this work has been increased by about twenty per cent. Many contributions, nearly all completely new and original, have been made by approximately eighty authorities.

The first four sections cover the basis ingredients of any power process (air, fuel, heat, and steam). The service functions, pumping and piping, are covered in Sections 5 and 6. Sections 7, 8, 9, and 10 deal with power-producing equipment (boilers, turbines, condensers, and gas turbines). Sections 11 and 12 are devoted to refrigeration, heating, ventilating, and air conditioning while transportation (diesel engines, land, air, and marine transportation) is covered by Sections 13, 14, and 15. Electric power, the end product of power machinery, is the subject of Section 16. Atomic energy, instrumentation, power test codes, and mathematical tables are the subject matter of the last four sections of the book.

Helpful index entries guide the user to specific discussions as well as to broadly pertinent passages, and multiple page references direct him to the various shades of meaning.

Kent's Mechanical Engineers' Handbook—Design and Production Volume

By Colin Carmichael. Published by John Wiley & Sons, Inc., New York. 1950, $8.50 Twelfth Edition.

Engineers would particularly benefit by possessing this volume which deals with materials, processes, and the mechanical design and fabrication of equipment. Helpful information is contained within its pages for those engineers who

design and manufacture machinery, appliances, mechanical equipment and other engineered products.

This volume is divided into the following sections: Selection of Materials; Design Principles; Design and Selection of Machine Components; Production Processes, Production Plant Equipment; and Mathematical Tables. Each subject is presented in such a way as to give the engineer a quick grasp of the essentials of the field as well as technical data which consists of basic principles; working formulas, charts, and tables; standard dimensions, proportions, and specifications; and illustrated discussions of typical equipment. For more detailed information, there are references given in the text and at the ends of many of the chapters.

Dictionary of Business Terms

By L. A. Robb, vice president, Ambursen Engineering Corp. Published by John Wiley & Sons, Inc., New York. 1950. 219 pages. $4.00

This is a companion book to the author's Engineer's Dictionary. The present dictionary is in English/Spanish and Spanish/English and includes all words and phrases used in the business world. The book is extremely handy in carrying on efficient, concise business with the Spanish-speaking nations. Complete banking, shipping, loading, commercial words and phrases are given. This book complements the Engineers' Dictionary.

Machine Tools for Engineers

By Charles R. Hine, Assistant Professor of Manufacturing Processes, Rensselaer Polytechnic Institute. Published by McGraw-Hill Book Co., Inc., New York. 1950, 355 pages, $3.50.

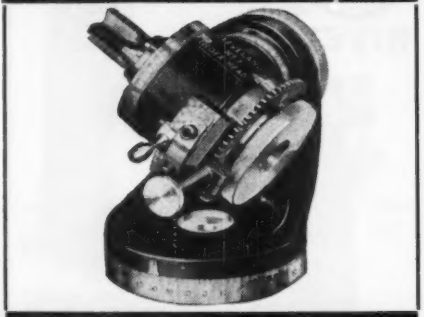
The fundamentals of machine tools and production processes are fully discussed in this text in order to familiarize engineering students with this field as well as to provide them with a complete background. This book on manufacturing processes is the first volume to be produced from courses developed at Rensselaer Polytechnic Institute. The second volume, on casting and forming, is in preparation.

Professor Hine gives a descriptive and analytical treatment of all types of machine tools, how they are used, what they can do, and what their limitations are. Some of the machine tools discussed are: lathes, shapers, planers, milling machines, boring machines, etc. The ways in which they affect design of any product are discussed, and important machining processes are also covered.





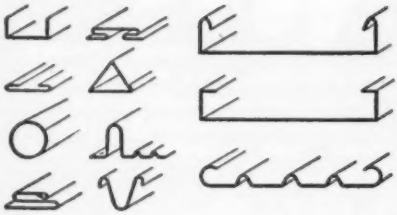
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The Science of Wrinkle Finishing

By W. A. Waldie. Published by Research Press, Inc., Dayton, Ohio, 1949, 204 pages, $5.00.

In this volume, which is the first authoritative book covering all phases of Wrinkle finishing, Mr. Waldie attempts a definitive study of "Wrinkle" from both the user's and the formulator's viewpoints. This book is a step-by-step education on how to cut the costs of industrial finishing.

The author has invented many of the basic patents on "Wrinkle" finishes having devoted much of his life to developing formulae and methods of application, as well as in research; thus, he is well qualified to write such a book. The most fruitful contributions have been in the techniques of oil treatment; and the treatise closes with an admirable outline for the study of oils. The formulae for obtaining a high metallic gloss or suede-like finish is discussed from the breakdown of the various oils used, to the synthetic types of oils which can be substituted.

This book is a profitable tool in formulating and manufacturing, as well as applying wrinkle finishes; and an invaluable reference book for every technical library, application shop, industrial finishing department and laboratory.

Practical Benchwork for Horologists

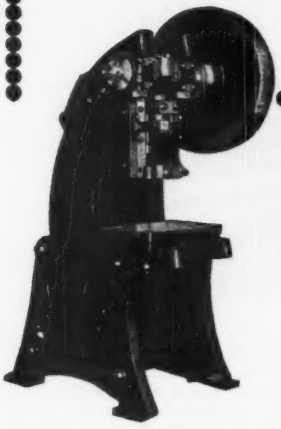
By Louis Levin and Samuel Levin. Published by Louis Levin & Son, Inc., Los Angeles, 1950 Eighth Edition.

This is a practical handbook for the watchmaker, instrument maker, and machinest containing 475 excellent illustrations. A considerable portion of the book is devoted to the watchmaker's lathe and its attachments. The emphasis upon good tools and how to use them shows the author's understanding of horological literature of today.

The opening chapter covers a broad discussion of the horologists' tools and their uses: lathes, chucks, grinders, hand rests, measuring devices, slide rest tools, pivot polishers, drill presses, milling and grinding attachments, depthing tools, fly cutters, and others. The remaining chapters discuss repair problems, the principle of adjusting, the watch rate recorder, jewel bearings, watch performance with tests given by various laboratories and the tolerances allowed for judging the performance of watches, mechanical drawing, and the lever escapement.

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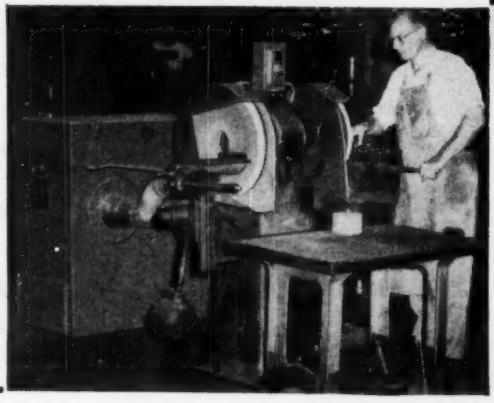
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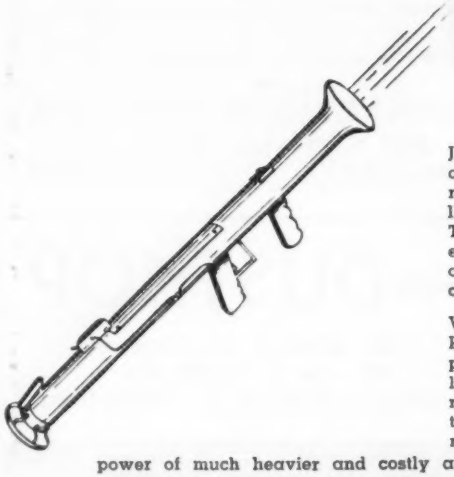
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TS56B
1 ⅜" Hole thru spindle
11¼" Swing
56" Bed



Just as every army needs its machine guns and bazookas to complement its heavy equipment, every shop needs one or more of these light, fast, easy to operate precision lathes. There are many jobs that can be done faster, at lower cost, and with less experienced operators, on Sheldon Lathes, than on more cumbersome, more costly machine tools.

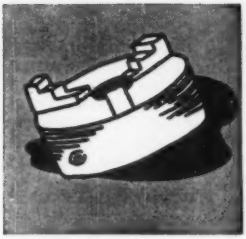
With extra collet capacity for size, "Zero Precision" Tapered Roller Bearings, more power at the spindle than other "small" lathes, and rigidity based on scientific placement of metal rather than cumbersome mass, these moderate priced lathes are money makers. Just as "bazooka" has the hitting power of much heavier and costly armament, the modern little lathes have the earning power of much big equipment.

They are modern tools you should be familiar with, for they cut cost and increase profits in many ways.

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MTBB
DECEMBER 1950

What's New in Metalworking

NEW LANDIS PLAIN CYLINDRICAL GRINDER

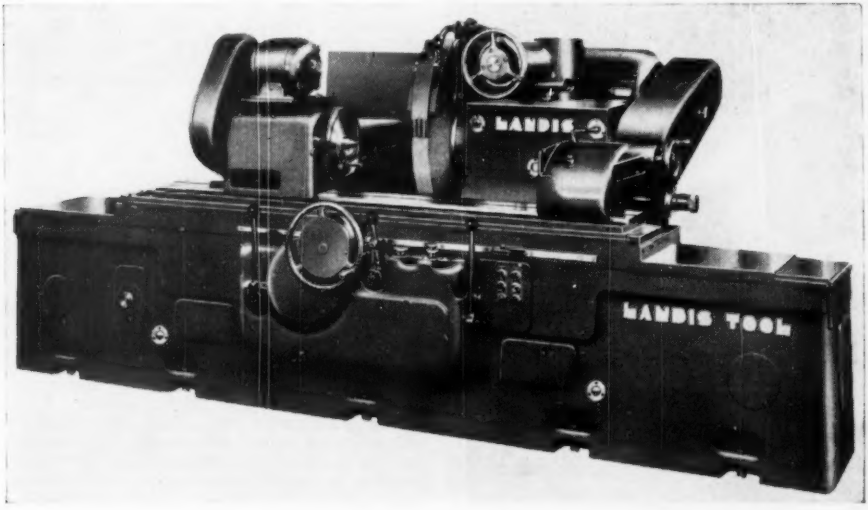
The Landis Tool Company, Waynesboro, Pa., announces a new line of 10″ and 14″ plain and semi-automatic grinding machines.

Among the improvements are a new heavy bed, new operating controls, new way lubrication methods and new telescoping covers for the carriage ways. Lengths between centers of 18″, 36, 48″, 72″, 96 and 120″ are available in both 10″ and 14″ swings. This size precision grinder is intended to be used for medium weight work pieces that must be cylindrically ground to a high degree of finish and accuracy. Small lot jobs, as well as steady high production, may both be handled. Grinding operations for which this machine is suitable include straight cylindrical, taper, shoulder, and with extra equipment, profile and angular grinding.

A 30″ diameter grinding wheel is standard and is driven from either a 10 or 15 h.p. motor, whichever is required. The headstock is powered by a 1 h.p. motor, with 4 work speeds from 54 to 150 r.p.m. Both the wheel drive and complete headstock drive are through vee belts.

Microsphere bearings support the grinding wheel spindle. They are babbitt lined, steel backed, one-piece bearings and are adjustable for clearance between spindle and bearing. Running clearance between spindle and bearing is less than with conventional sleeve or cap bearings. Bearing lubricant is carried in a separate reservoir in the wheel base casting.

Headstock spindles, wheel feed and hand traverse all use anti-friction bearings for ease of operation and accuracy. The wheel feed hand wheel can be operated as a coarse feed or fine feed. A



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Silvaloy No. 2501 and No. 5031 are clad materials furnished in three thicknesses:
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.016 thick consists of .008 copper center—clad both sides with .004 Silvaloy No. 503

Each of the alloys are furnished with or without radius, square or rectangular, Pentagon shape 80 degree with radius, Pentagon shape 60 degree no radius, triangle, circles, etc. Available in all standard tool sizes.

Shims are also available in Silvaloy No. 503, No. 2501, Constantine and Copper.

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hydraulically operated slow grinding feed for traverse grinding operations feeds

Telescoping covers are provided to protect the hand scraped carriage ways. A swivel table permits the grinding of tapered work. Traverse speeds range from 3 to 240 inches per minute. The traverse is hydraulically operated by a twin cylinder system. Tarry control for traverse grinding operations is variable and may be quickly and conveniently adjusted at the front of the machine. The two speed hand traverse has a fast sped for set-up and a slow speed for hand traverse grinding up to shoulders, if desired.

The bed is designed to preserve the alignment of the hand scraped ways and provide a rigid foundation for the operating portions of the machine. Reservoirs for hydraulic oil, lubricating oil and coolant are all part of this casting. Lubrication of the ways is by pressure. A filter and safety pressure switch is part of this system.

A large variety of extra equipment is available for speeding production and adapting the machine to special grinding operations. This includes angular wheel heads for grinding face and diameter in one operation, Landis-Solex automatic sizing, overhead wheel base mounted hydraulically operated wheel dresser. Wheels can be dressed either straight or with a profile. Also available are reciprocating wheel spindle, live spindle headstock, shoulder grinding attachment and extra length hydraulic infeed.

New Clearing Hydraulic Presses

A new line of heavy double action hydraulic presses is now being manufactured by the Clearing Machine Corp., 6499 W. 65th St., Chicago, Ill. These presses are equipped with two independent hydraulic circuits, one for the blankholder slide and the other for the punch slide, each with its own separate pump. This arrangement is said to preclude the possibility of losses in blankholder pressure during the punch stroke. The pressure on each corner of the blankholder may be individually adjusted, making the presses ideal for eccentric or irregular draws besides the more regular runs. The hydraulic circuits use valves for reversal, insuring quick return and accurate control of pressure.

An exclusive feature of these units is the provision for slowing the punch slide at the instant the blankholder slide is picked up on the return stroke. This action eliminates the shock customarily encountered when the punch slide picks up the motionless blankholder. Another feature is positive drive for both slides, which allows the gibbing to be set closely,

helping to assure more accurate work.

The extended gibbing of the punch slide in the crown is advantagous when eccentric loading conditions are anticipated. The punch slide gibs are adjustable within the blankholder slide while the blankholder itself is guided by deep gibs which may be regulated to compensate for wear.



The press illustrated above, which is installed in a leading aircraft manufacturing plant, has a 72" by 108" bed and is arranged for an 18" draw and lift out, including redraw work using an inside blankholder. These Clearing presses are available in any required size and are stated to be well suited to short run or high production work, depending on the capacity of the pumping equipment installed.

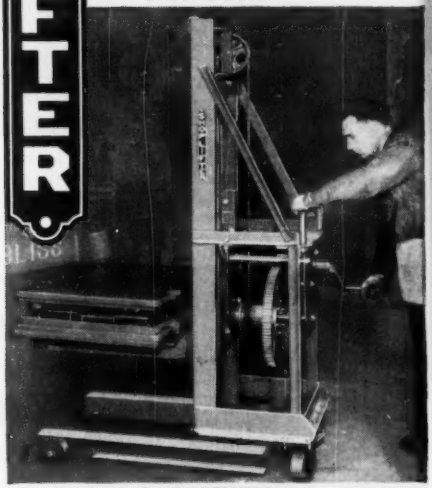
Bristol Stainless Steel Socket Screws

The Bristol Company, Mill Supply Division, Waterbury 20, Conn., announces the addition of stainless steel socket set screws and cap screws to its line of socket screw products. The new screws are made of type 18-8 stainless steel, and are non-magnetic and non-heat-treated. The set screws are made in diameters from No. 4 wire size to ¾", and the cap screws are made in diameters from No. 4 wire size to ⅝", and lengths from ¼" to 3½". Information and dimensions are given in an illustrated bulletin, No. 885.

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. . . let an Economy SHOPLIFTER do the heavy work around here.



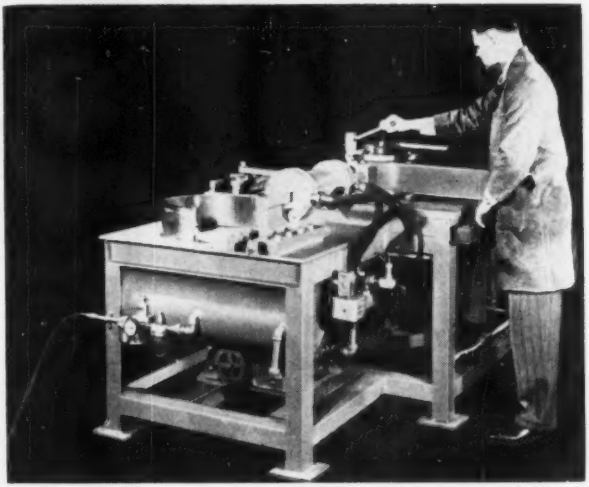
Every shop needs a SHOPLIFTER. Saves men, saves materials. Besides handling heavy dies, the SHOPLIFTER can stack drums and boxes, unload street trucks, pick up skids and be used as an adjustable height table.

All steel, arc welded frame. Easily operated hoist unit with automatic brake, safely holds load at any height.

500 pound capacity
Type D, hand operated.....$254.00
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Floor lock to hold machine steady:
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List prices, F.O.B. Chicago, subject to current discount

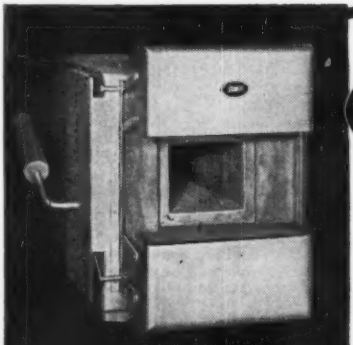
ECONOMY ENGINEERING COMPANY
4505 W. LAKE STREET • CHICAGO 24, ILL.

Pines Rotary-Fixture Bender for Irregular Shapes



A new rotary-fixture machine for bending irregular shapes or true radii in tubing, bars, extrusions or roll-formed sections up to 8" wide is announced by Pines Engineering Co., Aurora, Ill. The new unit is designed to speed handling of a wide range of bending work commonly required in the automotive, aircraft, metal furniture, and allied fields.

The bender employs a horizontal stationary pressure pad of either steel or bronze construction which is air operated against a rotating type die head. The die head is mounted on a heavy vertical spindle which is gear driven by a 7½ h.p. motor. A variable speed motor provides die head speed variations. Limit switches and adjustable dogs control the degree of rotation of the die head during the working cycle and are easy to set to provide the required angle of bends. Convenient electrical push buttons permit starting, stopping, or reversing the cycle at any point. A lever-operated cam work clamp



Features the exclusive TEMCO "Double Door" that saves processing time and cost... For access, just lower bottom half . . . upper portion remains fully closed to hold in heat. Easy-operating controls let you open and close bottom half, or both sections, at will.

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Model	Chamber W" H" D"	Furnace Only	With Temcometer Controller	With Electronic Controller
1730	8½x7½x13½	$235.00	$297.50	$445.00
1740	8½x7½x18	285.00	347.50	495.00

Write for complete data and dealer's name.

THERMO ELECTRIC MANUFACTURING CO.

486 W. Locust St., Dubuque, Iowa

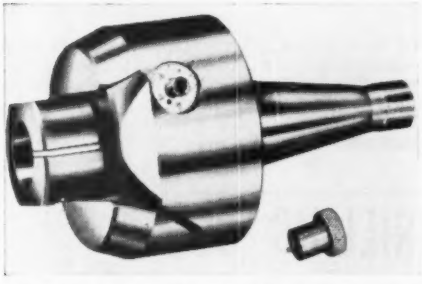
applies pressure for holding the stock. The adjustable slide mounting of the air cylinder provides the capacity for handling bends up to 7 feet in diameter. Change-overs in tooling set-up from one part to another can be made by one man in 30 minutes.

The stationary pressure pad feature of the machine avoids single point contact on work pieces, acts as an ironing shoe, and assures smooth, wrinkle-free bends. To meet varied pressure requirements, the unit is designed to accomodate either a 6" or an 8" air cylinder. A stroke of 12" is standard. Pressure tank, pressure regulator and lubricator are included as standard equipment. The illustration shows a typical 8" 16-gauge blower housing for a window room-cooler in the foreground on the table. The piece is formed to a mean average radius of 9"

The entire assembly of the new unit is designed for accessibility. The open table construction provides ready access to the limit switches, adjustable dogs, gear box, motor and bearings. Little maintenance attention is required. Greasing of the operating unit is necessary only every three months. The overall dimensions of the machine are only 4 ft. x 8 ft. Table height is 36". Net weight is approximately 4,500 pounds.

Intermediate Size Boring Head

An intermediate size Offset Boring Head is introduced to supplement the other sizes of Boring Heads manufactured by Everede Tool Co., 2000 N. Parkside Ave., Chicago 39, Ill.



The new size No. 3-50 Boring Head is 3 11/16" in diameter and has a maximum boring capacity of 4½". When equipped with an extension attachment it is possible to increase this capacity 100%. Containing the features of both the smaller and larger models, the No. 3-50 Boring Head has been developed for use in standard size vertical mills, jig boring machines, and turret lathes.

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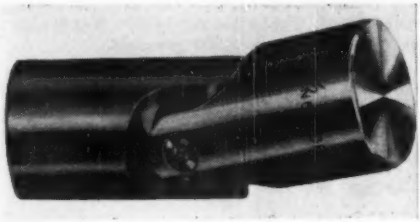
Heavy Duty Center Drills

The Link Engineering Co., 13840 Elmira, Detroit 27, Mich., has enlarged its line of "Ring-Seat" Center Drills to include a heavy-duty type "S" in 13 sizes from 3/64" to 5/16" drill diameter. Because of its chord-curve design, with a preformed 60° band, followed by an 82° flare, there is no sharp angular fatigue point between the tip section and the center forming section.

This heavy-duty drill is designed for heavy production parts, especially castings and forgings. The 82° angle above the bearing band enables the drill to be used as a countersink where rivets, flat and oval head machine screws are used. For this purpose it is a speedy one-operation tool. The 82° flare also automatically produces a safety center, with easy lubrication. The tool has a tip diameter slightly larger than the body of the tip section, providing clearance behind the tip, thereby reducing tip breakage and giving a longer wear period. Tip breakage is further reduced by the spiral flutes which facilitate the flow of chips and eliminate chip-jamming, a common cause of tool breakage.

Universal Joints Take High Load

Universal Joints with all parts interchangeable are now being manufactured by Boston Gear Works, Quincy, Mass. The new Boston Universal Joint is designed for high load carrying capacity and high static torque rating. It equals or exceeds government specifications set up for Aircraft (Army-Navy class 1) and shipbuilding (Type A-Class A). The yokes are



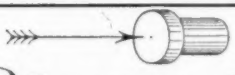
of heat treated alloy steel with bearing surfaces precision ground and o.d. ground to ±.000, -.001" for concentricity. Bearing pins and center bearing block are hardened and ground. A self-locking assembly ring assures secure assembly

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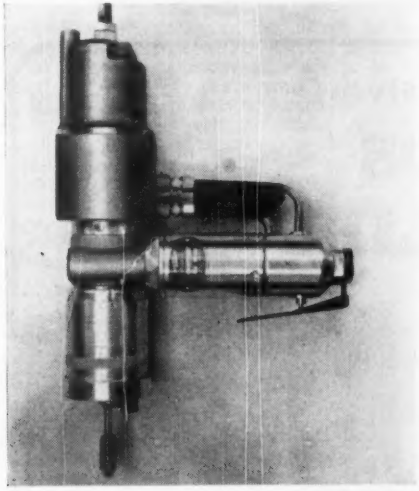
and permits quick and easy dis-assembly and re-assembly. A self-closing, ball valve oiler provides safe, sure lubrication.

Boston Gear Universal Joints are stocked in a full range of standard sizes, solid or bored to fit standard shafting.

Buckeye Automatic Countersink

A portable, air-powered countersinking tool which supplies its own thrusting action, and has a self-locking grip that holds the tool firmly to the work sheet while operating, is introduced by Buckeye Tools Corp., Division 14, 29 W. Apple St., Dayton 1, Ohio, under exclusive license granted by Boeing Airplane Co.

Almost completely automatic in operation, the tool requires no manual effort on the part of the operator other than inserting the mandrel in the hole which is to be countersunk. Expansion of the mandrel "locks" the tool in operating position. Drilling speed and depth of cut are pre-determined and automatically controlled. When the countersinking operation is completed, the mandrel contracts, permitting removal of the tool from the hole. Automatic operation also assures perfect concentricity between the hole and the countersinking cut, according to Buckeye Tools Corp.



The new tool, which has been designed for countersinking holes $\frac{3}{8}$" in diameter and larger, is available in capacities ranging from $\frac{3}{4}$" to $1\frac{1}{8}$" across the mouth. Use of the tool in the Boeing-Wichita plant reduced the time required to countersink $\frac{1}{2}$" holes in 75ST aluminum from $3\frac{1}{2}$ minutes to 35 seconds.





Niagara Squaring Shears Have Rotating Cutting Knife

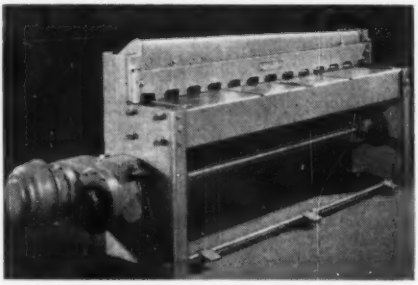
Economy, high output, quality and stamina are among the characteristics of a new line of power squaring shears recently announced by Niagara Machine & Tool Works, Buffalo 11, N. Y. These "Series One" Shears are designed to give the small sheet metal shop and the heating and air conditioning contractor a quality power shear at an attractive price.

Fabricated completely from formed steel plates, the new shears are massive and built low-to-the-floor. Four cutting edge knives are used in place of single cutting edge knives, so no down time is lost waiting for the dull knife to be reground. By simply rotating the knife to a new cutting edge, the operator gets four times as much use between regrinds.

Convenient gaging is assured by the front gages, side squaring gages and by a precision ball bearing, self-measuring back gage which can be indexed on intervals of 1/128 inch increments.

An electric foot switch can be furnished for remote control of the shear, permitting the operator to trip the shear from any convenient location when trimming long sheets or wide sheets which extend the full length of the bed.

The same patented Niagara Multiple Jaw Sleeve Clutch that is used on the larger, more expensive Niagara Shears and Niagara Presses, has been incorporated in these machines. This device provides instant engagement and positive drive. No heat is generated and there are

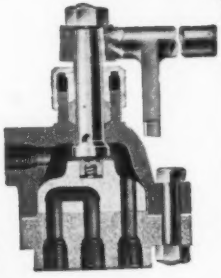


no friction members to wear. The clutch cannot click or pound because a new patented anti-friction detent brings the crosshead to a dead stop at the exact correct position after each stroke of the shear.

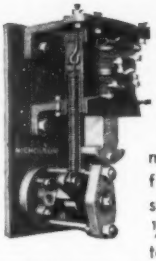
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Nicholson Control Valves

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In a wide range of plants—steel, metal working, processing, etc.—Nicholson cylinder control valves have now been in constant use for over 25 years. Their capacity for longer leak-free service is confirmed by many installation records which show Nicholson valves actually become tighter with use. This is because their flat discs tend to lap themselves on the seats.



Nicholson standard and special valves in lever, foot, solenoid, motor types; for air, gas, oil, steam, water; size ¼" to 2½"; press. to 5000 lbs.

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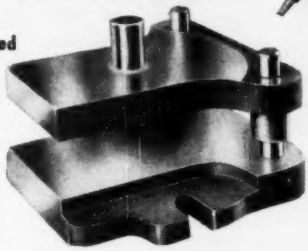
Use CMD **Anti-Scoring LUBRICANT**





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Non-corrosive and highly concentrated to withstand pressures greater than 50,000 lbs. per square inch. CMD lubricant gives your guide posts the best anti-scoring protection available. Safe. Economical. Prevents *all* metal-to-metal contact. Stays "put"—protects longer, reducing wear on moving parts.



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CHICAGO MANUFACTURING & DISTRIBUTING CO.
1928 WEST 46th STREET CHICAGO 9, ILLINOIS

closed transmission in which all mechanisms including clutch, gearing, flywheel and detent operate continuously in an oil bath. The entire drive and main shaft operate on anti-friction bearings.

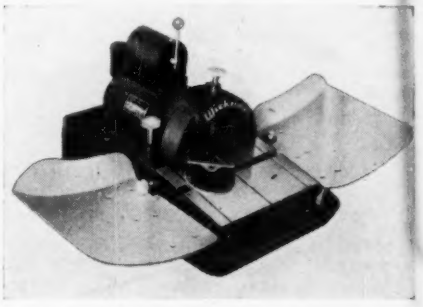
Extensive research in stress analyses was carried out to develop the closed steel box sections of the bed and crosshead which support the knives. Results prove that no other section or material can resist so efficiently with minimum deflection the horizontal, vertical and diagonal or torsional loads to which every shear is subjected.

Wickman Bench Grinder and Lapper

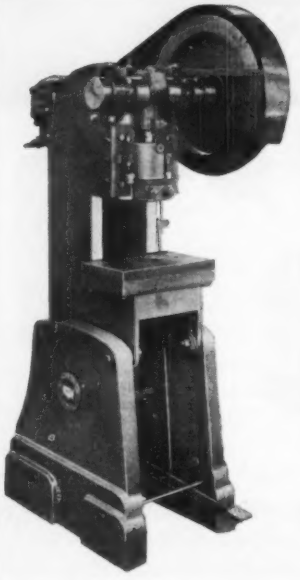
A new model bench grinding and lapping machine which enables use of silicon carbide abrasive wheels as well as diamond wheels is announced by the Wickman Manufacturing Co., 15533 Woodrow Wilson Ave., Detroit 3, Mich. The machine is said to be particularly suitable for use with Wickman-Neven steel bonded diamond wheels.

This new grinder, Model GF-2A, includes such features as a 1 h.p. reversible motor, 12 g.p.h. impeller type coolant pump, and swivelling wheel guard. It also includes a second wheel guard for use with ordinary abrasive wheels, a three-position table to provide for wheel wear, a milled protractor slot, and a new coolant filter.

The wider wheel guard is fitted with splash protectors on each side for effective splash control. The table may be set in three positions relative to the



grinding wheel face, thus allowing compensation for wheel wear. Two knurled head pivots provide quick adjustment. A milled slot on the table permits use ot a protractor for angular grinding, the protractor being supplied as an extra accessory.



IMMEDIATE DELIVERY

No. 1 U. S. 12-Ton PUNCH PRESSES

PRICE $540.00 F.O.B. Factory

ARRANGED FOR MOTOR DRIVE, LESS MOTOR

- **All Steel Frame**
- **All Bronze Bearings**
- **Heavy Construction**
- **Modern Design**
- **Precision Built**

Standard Specifications

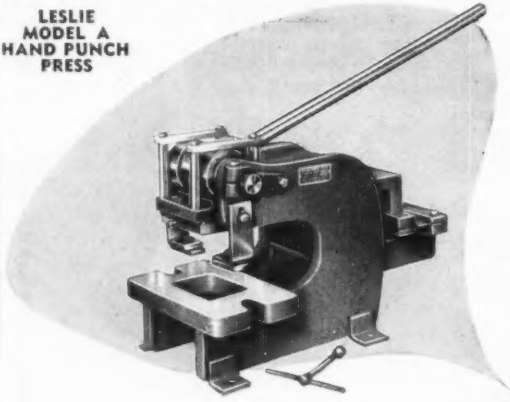
STANDARD STROKE	2"
SHUT HEIGHT	6 1/8"
AREA BOLSTER	8" × 14"
FRAME OPENING	7 3/8"
DIA. OF SHANK	1 5/16"
STROKES PER MINUTE	140-165
MOTOR REQUIRED	3/4-1140
WEIGHT OF PRESS	900 LBS.

MOTORS CAN BE FURNISHED FROM STOCK.

U. S. PRESS and TOOL CORP.
6456 NORTH HAMLIN AVE.
CHICAGO 45, ILLINOIS

A BLANKING DEPARTMENT FOR $120.00?

LESLIE MODEL A HAND PUNCH PRESS



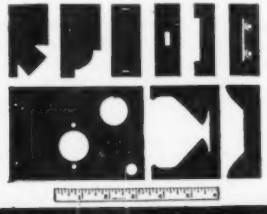
Sounds Far Fetched? Well, consider these points:

- Capacity Up To 15 Tons
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- 6" Throat Depth
- Large Punch Plate and Bed Facilitate Blanking Over Big Areas.

The Leslie Model A Press is the solution to your short run blanking problems. Write now for illustrated catalog and circular showing punches and dies.

Diagram below illustrates versatility of this Press — each blanking done with one stroke.

Tool your jobs at low cost from our wide variety of standard punches and dies.



LESLIE WELDING CO., 2941 Carroll Ave., Chicago 12, Ill.

Immediate Delivery
FROM STOCK
GREAVES-SILENT BAKELITE GEARS

No waiting when you order Greaves Silent Bakelite Gears. • We have them in stock NOW! • Your order will go forward immediately. • You'll appreciate the silent operation and added smoothness provided by Greaves Silent Bakelite Gears. • You'll marvel at their great strength to carry big power loads . . . their remarkable ability to successfully operate completely submerged in water. • You'll welcome their low cost. • No metal reinforcements required. • Save Time . . . Money . . . Labor!

We also make silent gears of rawhide and Fabriol.

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FOR CONCERNS CUTTING THEIR OWN GEARS, WE CAN MAKE IMMEDIATE DELIVERY ON BLANKS SAWED TO SPECIFIED DIAMETER AND FACE

Greaves MACHINE TOOL COMPANY
division of J. A. FAY & EGAN CO.
2013 Eastern Avenue
Cincinnati 2, Ohio



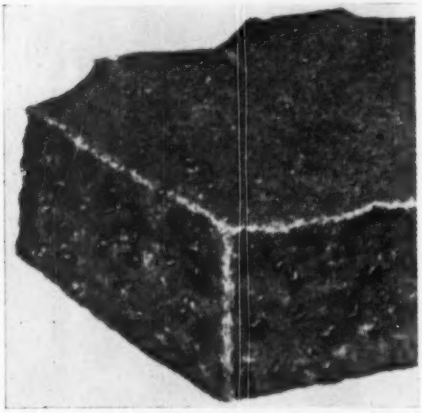
Simple in design. Easy to operate. Rigid construction including every worthwhile modern feature of milling machine development. With 18 spindle speeds (20 to 1000 R.P.M.) both the universal and plain millers are readily adaptable for heavy duty or light precision production work. Send for bulletin.

SEND FOR BULLETINS AND PRICE LISTS

Greaves MACHINE TOOL COMPANY
division of J. A. FAY & EGAN CO.
2013 Eastern Avenue
Cincinnati 2, Ohio

Flintcrust Liquid for Concrete Floors

A concrete floor "case-hardener," designated as Flintcrust Liquid, has recently been developed by Flexrock Co., 3634 Filbert St., Philadelphia 4, Pa. According



to its manufacturers, this compound requires no more labor to apply than the process of swabbing a floor with water; furthermore, the liquid works very simply.

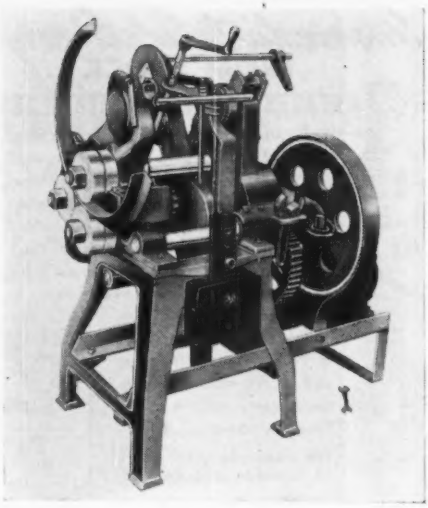
To the eye, and to the finger, a concrete floor may appear and feel smooth, but actually the surface presents minute "hills and dales"—as can be seen by the micrograph of a section of concrete floor, sixteen times enlarged, showing the rises and hollows in its surface. The "hills" are protected against the abrasive action of traffic, and the "dales" are sealed against the penetration of disintegrators by the use of Flintcrust Liquid.

The tiny raised surfaces are quickly ground off by traffic, exposing the softer under-surface to increased abrasion. Furthermore, water, oil, grease, acids, alkalies and other disintegrating foreign matter pentrate into the concrete through the tiny depressions, which amount to pores.

The Flintcrust Liquid is flushed over the floor; it is stated to make the surface up to ten times harder, increasing its resistance to traffic abrasion. It also penetrates and fills the depressions, taking their exact shape, hardening into a glass-like seal which cannot be redissolved, thus preventing disintegrating fluids from penetrating the concrete.

Reversible Circular Bending Machine

A new production circular bending machine, Model 14-R, which rolls either partial or complete circles in angles, flats, pipes, rounds, squares, tees, channels and various cross sections, has recently been introduced by Excelsior Tool & Machine Co., 3100 Ridge Ave., East St. Louis, Ill. The machine is actuated by means of finger-tip pushbutton controls located on the front of the machine; these buttons control forward, reverse and inching movements of the rolls, as well as stop.



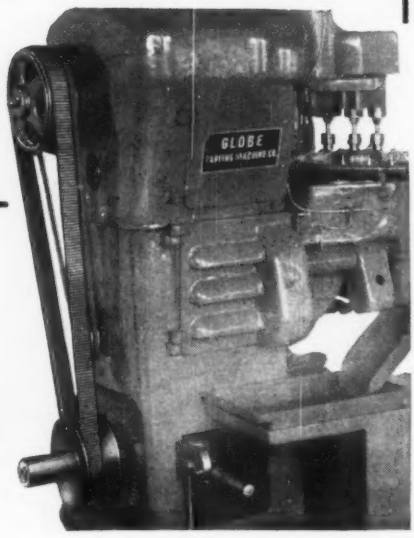
The rolls of the Model 14-R are hardened steel, 6⅞″ diameter x 1⅞″ wide x 2-3/16″ bore, with key-way. The shafts are heat-treated, 2-15/16″ diameter between bearings. The unit is powered by a standard 5 h.p., 220/440 volt, 3 phase, 60 cycle motor, furnished with the machine. The Model 14-R occupies a floor space of 38″ x 60″, and is 60″ high; weight is 2200 lbs.

The machine has a capacity of up to 2″ x 2″ x ¼″ angles in mild steel. A graduated adjustment stamped from 8″ to 96″ is for the purpose of predetermining the approximate diameter of the material rolled. The pressure friction plates should be adjusted so that pressure against angles is sufficient to keep angles from twisting while rolling. An adjustable set screw stop at the rear of the right hand eccen-

Machines Handle Wider Range of Work

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Convert fixed-speed machines to adjustable models easily, at low cost; widen range of work. Raise, lower speed at fingertip accurately, infinitely, without shutdowns. Sizes fractional to 8 h.p. Ratios to 3:1. Write for catalog.

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FLEXIBLE COUPLING CO.

5026 W. Lake St. **Chicago 44, Ill.**

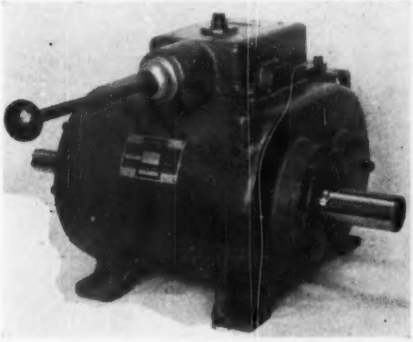
Also mfrs. of Lovejoy Flexible Couplings and Lovejoy Universal Joints.

tric regulates the diameter for duplicating circles. The rollers have two size round edges to conform to light and heavy angles.

The Model 14-R is a reversible machine and can be furnished only as a direct motor driven unit, with a magnetic switch and pushbutton controls.

Transmission Has Four Speed Changes

A new design of transmission, of 20 h.p. capacity with an input speed of 900 r.p.m., is announced by Western Manufacturing Co., 3400 Scotten Ave., Detroit, 10, Mich. The four speed changes are in geometric progression of 1.7 to 1 with a 5 to 1 overall ratio. The transmission case is large enough to accommodate special ratios up to 9 to 1, according to the manufacturer.



All gears and shafts are of alloy steel, heat treated, and the gears are shaved. All revolving shafts are mounted on antifriction bearings and the case is oil sealed. This unit is identified as the Model 420 and has application on machine tools, chemical plants, electrical machinery, etc.

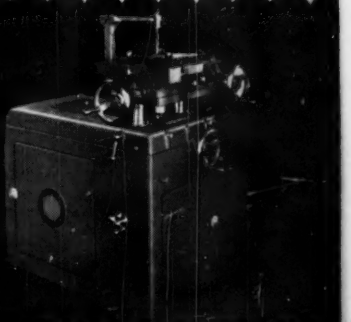
FOUNDRY QUIZ

Answers to quiz from page 87.

1. Sieve
2. Loosening pattern from mould
3. Projecting piece in cope section
4. Ball of clay for closing tap hole
5. Metal placed in furnace
6. Tool used for packing sand around pattern
7. Mould made to hold shape permanently
8. Upper part of the mould
9. Opening from which moulten metal is drawn from furnace
10. Hinged corners

CUT time and Costs

WITH THE ELECTRIX PRECISION DIE MILLER



The ELECTRIX PRECISION DIE MILLER is designed to mill inside and outside shapes such as blanking dies, draw dies and cams. Milling of complicated die and cam outlines is reduced to minutes with the ELECTRIX PRECISION DIE MILLER. Actually see complicated outlines milled in MINUTES — NOT HOURS. Inverted infinite speed precision spindle sealed for life bearings — Counter balance fly wheel—assuring smoother finish and longer tool life.

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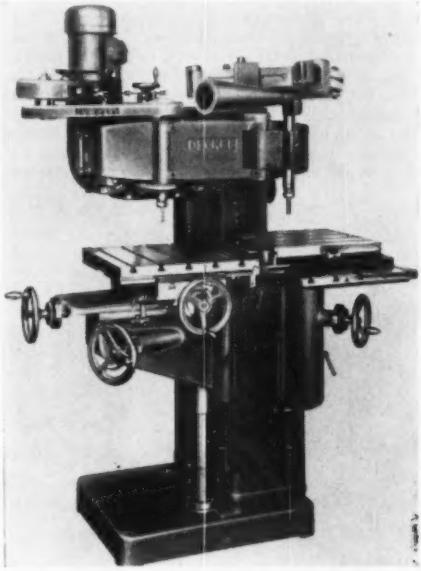
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means better production at a lower cost
Efficient tool designing in post-war's competitive production is a "must". Our experience guarantees you tools — designed for economy of operation, resulting in your increased production at lower costs.
COLUMBUS DIE • TOOL
and Machine Co.
930 CLEVELAND AVE., COLUMBUS 1 OHIO

Universal Copy-Milling Machine

The Cosa Corporation of 405 Lexington Ave., New York 17, N. Y. national representatives, introduce Friedrich Deckel's new model KF 1 Universal Copy-Milling Machine.

This unit has been developed for the manufacture of small and medium dies and molds weighing up to 110 pounds.



Together with the varied attachments made for this machine, molds and dies are said to be produced with greater economy. When copy-milling at a 1:1 ratio, the pantograph serves only as a guide for the tracing stylus and cutter head spindle. The parallel guiding device moves longitudinally, transversely and vertically; and its weight is counterbalanced by an adjustable spring. Cutter spindle speeds are stepless between 300 and 9500 r.p.m.

The following attchaments are available: Optical Contacting Device, to indicate when the stylus touches the master, is used only during rough milling operations (when cutter spindle is locked and tables are coupled and moved simultaneously by hand wheels).

A Circular Milling Attachment is used for milling radii and for making concave and convex patterns of geometrical circular forms.

A reduction and enlargement attachment, line milling device for rough

441 STANDARD SIZES OF MARSHALL STEEL PRECISION GROUND FLAT STOCK

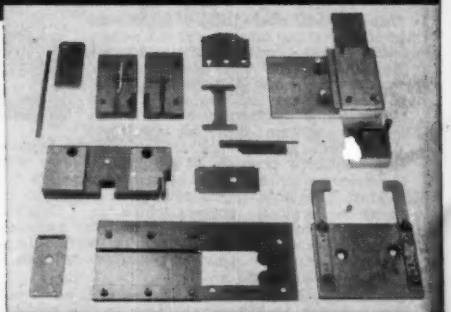
The world's largest range of sizes of precision ground tool steel in three grades are available, ready for immediate shipment and the layout bench.

WATERcrat: A fine grained electric furnace high carbon tool steel. It has been wet ground to remove all bad surfaces and to assure velvet finish of virgin metal.

OILcrat: An outstanding product of careful handling assures you of a fine grained electric furnace oil hardening ground flat stock ready for the layout bench.

AIRcrat: This air-hardening tool steel shows less size change and offers a greater safety in hardening than either of the other grades. Box 108-C

Write for descriptive literature, catalog of sizes and prices.



MARSHALL STEEL CO.
LA GRANGE, ILLINOIS

The Aristocrats of Ground Tool Steel

and finish milling, and a 15" dia. circular table are also available for use on the Deckel Copy-Milling Machine.

The standard equipment of this Universal Copy-Miller includes: one 2-speed motor for any standard voltage, one stylus holder with nut, one stylus, one single lip cutter, six collets, two endless corded belts, two V-belts, two grease guns, one set of wrenches and a book of directions. Dimensions — length 47", width 59", height 73", weight 2550 lbs.

Shop-Duty Drill Press Vise

To meet the demand among shop men for a sturdy, compact Drill Press Vise for shop operations, Chicago Tool and Engineering Co. 8384 South Chicago Ave., Chicago 17, Ill., has announced the new No. 40 Drill Press Vise. This new model is designed for quick, easy setups on jobs which would otherwise require expensive jigs and fixtures. Milling, drilling, and grinding are only a few of the many jobs that can be done. The vise is precision made and built for heavy service.

The Palmgren No. 40 Vise has jaws 3½" wide, opens 3½", and has a jaw depth of 1⅝". The movable jaw is grooved vertically for holding round work. It is low-built, having only 2½" overall height.

The heavy steel adjusting screw has a coarse pitch Acme thread for fast action, and a swivel crank handle is provided for ease in turning when the vise is mounted on a machine table. Three bolt lugs are located on the vise base to insure rigid mounting and to secure locking on the machine.



Both the top and bottom surfaces are accurately machined and the movable jaw slides easily on the machined ways of the vise body. High grade gray iron castings are used in its manufacture and it is unconditionally guaranteed as to workmanship and material.

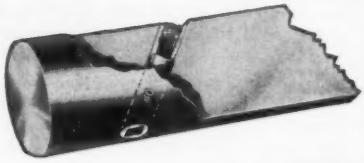
How SQUARE HOLED SLEEVES SPEED UP TOOL-MAKING!

One of the most difficult problems in tool making can be solved easily and quickly with Sturdy Square Holed Sleeves. The perfection of broached square holes can be had in boring bars, milling cutters and many other applications at a small fraction of the cost of imperfect hand-made square holes. The Sturdy Square Holed Sleeve consists of a round sleeve with a perfectly square hole broached through the center. The hole is tapped at one end to receive a back-up screw which is furnished with the Sleeve. The Sleeve can be sweated or pressed into a drilled and reamed hole to make a perfectly square accurate hole in a very few minutes.

The Sturdy Square Holed Sleeve will save you many hours and many dollars in the making of boring bars, tool holders and other tools requiring square holes.



Patents Pending



BUSHINGS MADE IN FOLLOWING SIZES:
3/16, 1/4, 5/16, 3/8, 7/16, 1/2, 5/8, 3/4, 1"

STURDY BROACHING SERVICE
23516 TELEGRAPH RD., DETROIT 19, MICH.

Write for Literature

LET ENCO'S VERSATILITY CUT YOUR COSTS



Photo No. 1
¾" square tool bit mounted in Model 4½-S turret used for facing cut.

Photo No. 2
The same tool used for broadface turning merely by indexing turret one position or 30°

Photo No. 3
Same tool used for inside chamfer merely by indexing back two positions or 60°

The above photos illustrate the flexibility of 12 position indexing whereby each tool may be used in three different working positions.

SPECIFICATIONS OF A FEW OF MANY ENCO TURRETS

Model No.	HD-2	6-S	4½-R	4½-S	3½-R	3½-S
Suggested Lathe Size	16" to 24"	14" to 20"	15" to 19"	13" to 16"	12" to 15"	10" to 13"
Tool Block Size	6½" sq.	6" sq.	4½" sq.	4½" sq.	3½" sq.	3½" sq.
Solid Tool Capacity	1½"	1¼"	1"	¾"	⅞"	½"
Price	$138.50	103.50	66.50	53.50	46.00	36.75

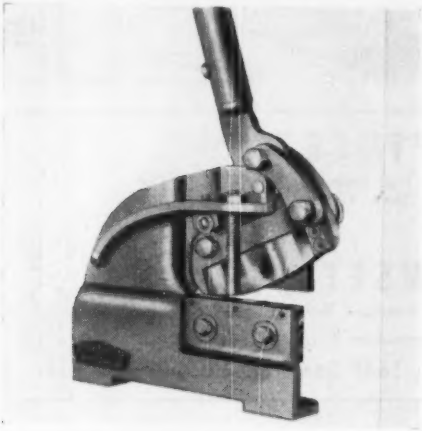
WRITE FOR CATALOGUE NO. 50 WHICH SHOWS TYPICAL APPLICATION PHOTOS OF MANY OF ENCO'S 35 MODELS ON ACTUAL JOBS.

Also Mfrs. of Miti-Mite Magnetic Base Units and Enco Hexturret Bed Turrets and Tailstock Turrets for 9" to 18" Lathes

ENCO MANUFACTURING CO., Dept. 2120, 4524 Fullerton Ave., Chicago 39, Ill.

Redesigned Beverly Slitting Shear

A new Slitting Shear recently introduced by the Beverly Shear Mfg. Co., 3005 W. 111th St., Chicago 43, Ill., embodies new design features, which, it is claimed, give maximum slitting and trimming capacity in a small portable shear. The shear is made in three sizes to slit 14 ga., 10 ga. and 3/16" mild steel.



A rigid, strongly braced one-piece frame is employed to assure permanent alignment of upper and lower blades and clean cutting action in any metal up to capacity. The addition of an adjustable shoe at the pivot point of the upper blade provides additional support which increases the strength and cutting efficiency of the shear.

Compounded linkage of the upper blade provides easy cutting action, regardless of the thickness of metal, up to capacity. Upper and lower blades are adjustable to compensate for wear and re-sharpening.



REICH 3-WAY
PRECISION TEST INDICATOR

Lifetime conical bearings, stainless and non-magnetic. Sturdy construction. Needs no service or adjustment. .014" reading.

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7/0	2.75	1.65	3.85	2.30
6/0	2.50	2.00	3.85	1.90
5/0	2.50	2.00	3.60	2.00
4/0	2.50	1.75	3.60	2.00
3/0	2.25	1.57	3.60	2.00
2/0	2.25	1.80	3.30	1.80
0	2.25	1.57	3.10	1.55
1	2.50	2.00	3.20	1.60
2	2.75	2.20	3.30	1.65
3	3.00	2.10	3.30	1.65
4	3.50	2.80	3.60	1.80
5	3.75	3.00	3.85	1.90
6	4.25	3.40	4.70	2.35
7	5.00	3.00	5.80	2.90
8	5.75	3.45	7.45	3.75
9	6.25	3.75	9.10	4.50
10	7.50	4.50	9.90	5.45

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1/4	carat	$ 3.85
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3/4	carat	7.15
1	carat	9.35
1 1/2	carat	12.65
2	carat	16.20

Available in 7/16"x6" hand tools; also Landis, Norton, and Cincinnati Nibs.

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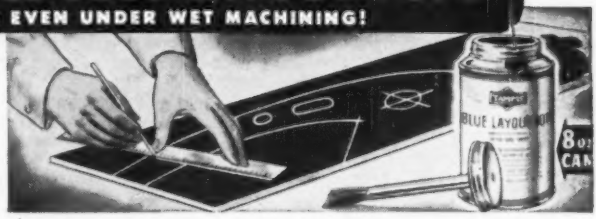
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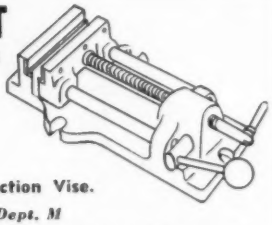
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by HARTMANN



All Purpose Tool Room and Machine Shop Vises.

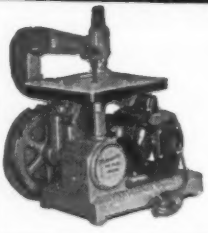
The
JAWSET
Adjustable Pressure Production Vise.



For Information Write Dept. M

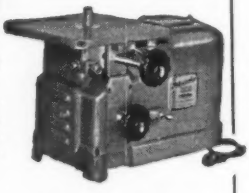
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. . . features that result in higher efficiency, improved operating convenience and, most important, lower costs in your filing, sawing, lapping and grinding operations.



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RICE PUMP & MACHINE CO.
1027 S. 40th St. Milwaukee 15, Wisconsin



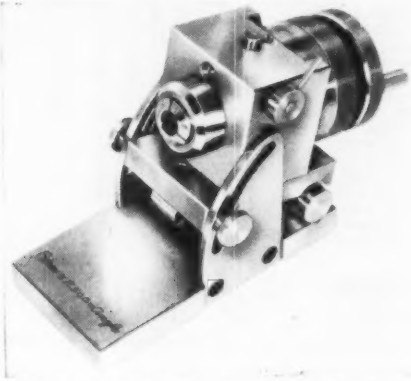
THE MULTIFORM BENDER

PRODUCES — Springs, Stampings, Wire Forms, Brackets, Bus Bars, Clamps, etc. AT A PROFIT.
No Special Tooling

J. A. RICHARDS CO. KALAMAZOO MICHIGAN

Ingenious Grinding Fixture

The Starco Master Grinding Attachment is a precision instrument designed to facilitate the accurate grinding of most combinations of surfaces in a single setting using only a surface grinder. Any combination of cylindrical surfaces, tapers, indexed sections, splines, grooves, radii, or other forms may be closely ground with absolute concentricity of form. The device is manufactured by Star Gauge Co., Inc., 261 Grove Ave., Springfield, Mass.



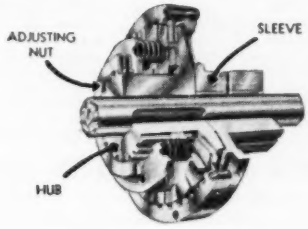
The unit embodies four major features which contribute to maximum savings in setups: a sine plate held to within .0001" allows rapid setups for tapers; 12 positive stops held to within 1 minute permit rapid indexings of common divisions; for odd angles, a finely cut dividing head and vernier provide settings for any angle within 2½ minutes; the unit itself, hardened and ground square with the spindle, eliminates the use of indicators in setting up. Combining two or more of these major features practically eliminates the setup time normally required for several machines.

The Starco Master Grinding Attachment is of a size and weight that can be conveniently placed under the wheel of the surface grinder. It is not limited by the vertical travel of the grinder. The attachment can be removed from the grinder for checking purposes without losing the setting. A simple fixture, it requires no setups.

The grinding attachment is a useful devise in toolrooms for rapid, precision manufacture of gages, punches, jigs and fixture parts, die parts, studs, etc. It is said to be indispensable for checking forms and many machining operations in the toolroom.

The NEW *Improved* series of
HILLIARD
Slip Clutches

- PROTECT YOUR MACHINERY FROM DESTRUCTIVE OVER-LOAD
- IMPROVE THE CONTROL OF YOUR REWIND STAND



REGULAR SERIES—From 50 inch lbs. to 300,000 inch lbs. torque. Prevents transmission of overload. Constant torque clutches can be pre-set.

NOW AVAILABLE — Adjustable while running constant tension clutches. Provide ample friction surface for heavy duty use in reeling and winding operations.

THE NEW LIGHT SERIES—high capacity in small size. From 10 inch lbs. to 500 inch lbs. torque. Metallic plates, disk springs. Constant torque—easily adjustable.

- SAVES MONEY . . .
  INCREASES PRODUCTION . . .

FOR DETAILED INFORMATION WRITE FOR BULLETIN NO. 300

Also manufacturers of over-running and Single Revolution Clutches.

THE HILLIARD *Corporation*

126 W. Fourth Street Elmira, New York

DRILL BREAKAGE Reduced 86.7%

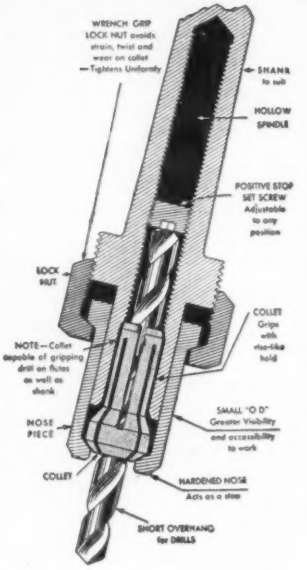
Here's How It Was Done!

Large automobile manufacturer famous for production efficiency, gave us the following report of a test of the Erickson Collet Chuck. As a result of this test, manufacturer has standardized on Erickson Collet Chuck for this operation.

"Erickson chuck is used for drilling 1200 vent holes per day, average drill breakage one per day. We formerly broke from 8 to 10 drills with the ——— chuck. Now have average breakage of 2 drills per 900 oil holes drilled in pistons with 1/8" Erickson chuck. Had breakage of 15 drills per 900 holes using old drill sleeve method." Learn how this efficiency can be yours, too! Send for complete data on Erickson holding equipment now and learn how Erickson tools applied to your problems can boost production and reduce costs.

NO OTHER COLLET CHUCK ON THE MARKET

1. Delivers accuracy of .005" TIR.
2. Permits collapse of 1/32" (Replacing 7 standard single purpose collets)
3. Grips drills on flutes—permits stubbing
4. Gives such positive grip due to exclusive surface contact.



ERICKSON TOOLS DIVISION

2315A HAMILTON AVE. CLEVELAND 14, OHIO

FOR A WIDER VARIETY OF WORK



PERKINS PRESS No. 10-M-32
Capacity approx. 20 tons
Deep throat-depth 32"
1½ h.p. motor flywheel drive

Is your present press equipment adequate to your needs? Many plants have increased production and lowered costs with the addition of a Perkins *specialized* Press.

Cost-conscious, production minded plant engineers will profitably investigate the possibilities presented in the Perkins No. 10-M-32. Write for Bulletin.

PERKINS MACHINE COMPANY

WARREN, MASSACHUSETTS

Press builders for 50 years

Presses built to special specifications

Motor Drive Unit for Bench Lathe

Louis Levin & Son, Inc., 782 E. Pico Blvd., Los Angeles 21, Calif., manufacturers of small precision lathes for instrument work, are now marketing a motor drive unit which can be used either with their own lathes or with any



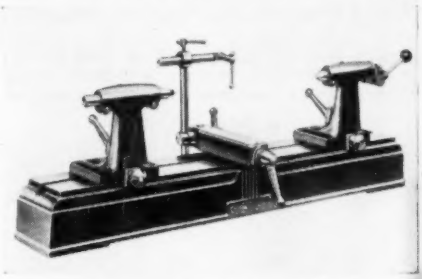
other make of jeweler's lathe. It is completely wired for instant use and includes a reversing switch as well as a foot operated starting switch. A ½ h.p., 1725 r.pm. motor supplies ample power for any job within the capacity of this type lathe. The motor drive unit is being supplied either for separate mounting or complete with a 15 drawer bench, as shown in the illustration. Bulletin G describing this equipment is available upon request.

Bench Center Has High Accuracy

The Delta-Milwaukee Bench Center provides convenience and accuracy for inspection work at low cost, it is claimed by engineers of the Delta Power Tool Division, Rockwell Manufacturing Co., 600 E. Vienna Ave., Milwaukee 1, Wis. The bench center handles a maximum of 19½" between centers and 10½" over the bed.

With a universal indicator support bracket which is furnished separately, this Delta-Milwaukee development is a completely self-contained unit. According to Delta, no other tools or parts are needed to operate it.

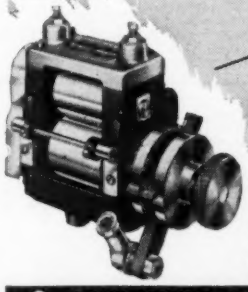
The indicator support bracket can be firmly locked on the bed of the Delta-Milwaukee Bench Center. The arm for holding the indicator can be put into any position, vertical or horizontal. A convenient clamp handle eliminates the



need for a wrench or pliers to clamp the indicator in place.

Design and construction features include a heavy cast bed, fully normalized to relieve all strain. Accurately ground-top surface, with milled T-slot for clamping head and tail stock and indicator support bracket is standard equipment. Precision bored head and tail stocks that are identical castings and completely interchangeable without variation in accuracy are included, as well as hardened and ground 60°-angle centers.

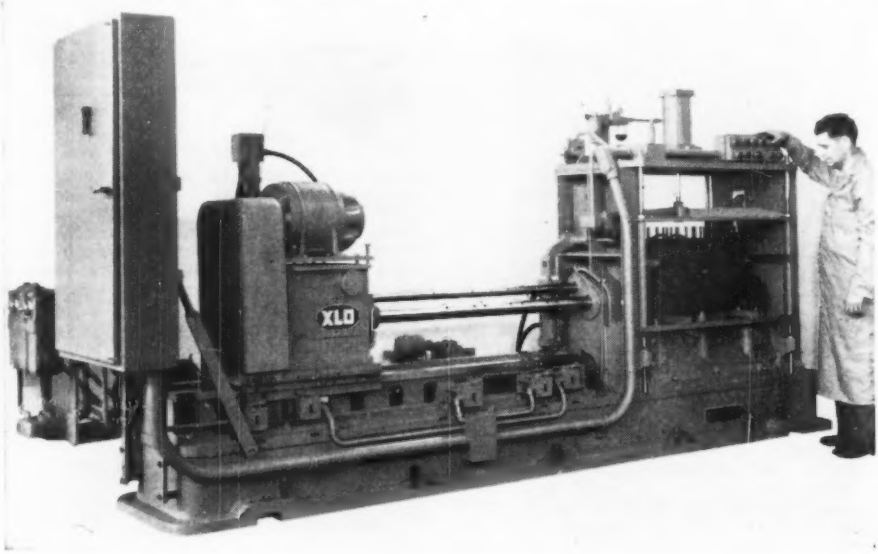
A UNIVERSAL FAVORITE:
ROLL FEED $89.50
A truly remarkable unit which is a universal favorite and priced within your budget. Quality built for long dependable service. Models available to fit all sizes of power presses.



Write today for informative circular
ROLL FEEDS CORPORATION
Pawtucket -:- Rhode Island
Builders of Electrix Precision Die Millers

Line Boring Machine for Engine Blocks

On the Ex-Cell-O Line Boring Machine, crankshaft and camshaft bearings can be precision line bored simultaneously to close tolerances in an automatic cycle. The operator merely pushes the blocks into the fixture, presses the start cycle button, then removes the blocks at the completion of the cycle. Net production is from 25 to 35 blocks per hour, depending on the particular job. The machine is designed and manufactured by Ex-Cell-O Corporation, 1200 Oakman Blvd., Detroit 32, Mich.



In some instances it has been found advantageous to incorporate other precision boring operations in this machine, thereby keeping additional bores in accurate relationship to the crankshaft and camshaft bores. Dowel holes in the transmission end of the block and distributor shaft holes are sometimes done at the same time on the same machine.

A perfectly balanced crankshaft cannot run smoothly if the bearing bores in the engine block are not in line—the bearings with caps assembled must be bored with all the tools supported in one boring bar as shown above on the Ex-Cell-O Line Boring Machine.



MOLYKOTE®

THE AMAZING DRY LUBRICANT

FOR LARGE MACHINE TOOLS

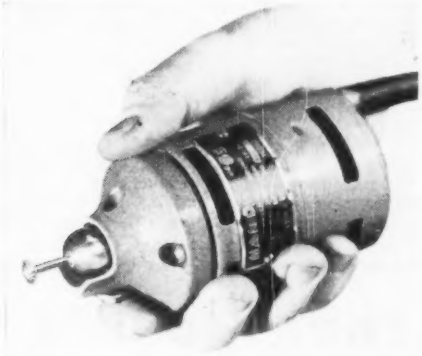
Many manufacturers of large machine tools apply MOLYKOTE during assembly to all sliding surfaces and find it an excellent "wear-in" lubricant. **Send for descriptive literature.**

THE ALPHA CORPORATION
GREENWICH, CONN.

Hand Power Tool for Precision Work

Chicago Wheel & Mfg. Co., 1101 W. Monroe St., Chicago, Ill., announces its new "Handee '85' " tool and companion complete-with-accessories kit, the "Handee Workshop." The tool unit proper, the "Handee '85'," is said to be suited for industrial production lines as well as for fine handicraft work.

Balanced and shaped to fit the hand, the 'Handee '85' " has an idling speed of 27,000 r.p.m. and a load speed of 20,000 r.p.m. It weighs two pounds and chucks interchangeable spring collets of 1/16", 3/32", and 1/8" capacity. The new chuck construction assures smooth running action with a quick, firm grip on all accessories, according to the manufacturer.



The tool has a cooling arrangement which permits it to run all day long without heating up excessively. A steady stream of air weaves and swirls automatically around the motor, keeping its housing comfortably cool to the hand.

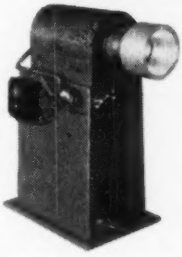
A unique feature of the tool is a cast-in boss, just behind the chuck, which holds easily-attached routing and molding shoes. Precision versatility is thus possible in wood working; depth of cut is quickly regulated, and 20 different molding cuts can be made.

Work in metals, plastics, and other materials is well within the scope of this tool, in such diverse operations as grinding, drilling, polishing, sawing, cutting, standing, and engraving.

Although some 200 different accessories are available for use with the "Handee '85'," the firm has assembled 41 matched attachments together with the tool in a steel-gray, fitted metal case. This combination, called the "Handee Workshop," is designed for home or shop use.

SCHAUER

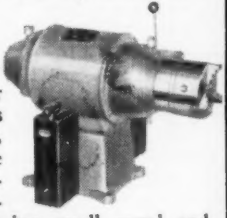
SPEED LATHES



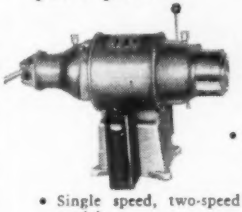
Who Uses Them?

General Electric • Aluminum Co. of America • Studebaker • Thos. A. Edison • Ford Motor • Westinghouse Electric • Owens Illinois Glass • Lockheed Aircraft • Western Gear Works • Bryant Electric • Royal Typewriter • Yale & Towne • Eastern Airlines • Minneapolis Honeywell • Remington Arms • American Locomotive • American Brass . . . and several hundred more top drawer companies!

Why?



Because Schauer Speed Lathes cut from 30% to 90% off the cost of polishing, filing, lapping or de-burring small metal and plastic parts!



• Chuck, collet or vacuum-holding fixtures.

• Single speed, two-speed or variable speed models.

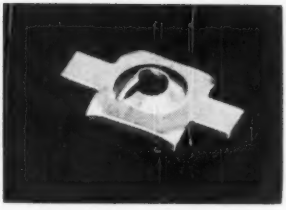
• SAVE WITH SCHAUER! Write for Bulletin 490.

SCHAUER MANUFACTURING CORP.

Originators of Today's Speed Lathes

2064 Reading Rd., Cincinnati 2, Ohio

Cage Nut Eliminates Welding



It is no longer necessary to spot weld a cage for any "floating" nut, or to buy spring steel nut retainers that snap or lock in place—when the cage can be punched right in the sheet metal as a nut holder. Prestole Corporation, 1369 Miami St., Toledo 5, Ohio, announces that their new cage nut, P-1079, does not require a separate cage. It is locked in place merely by dropping it over two pre-punched loops that can be quickly pulled up with ordinary pliers.

This new method is said to save a tremendous amount of metal, does away with handling separate cages and eliminates spot welding. The nut is quickly locked in place because the loops are already formed up at a 45° angle, making the pliers' "pinch-in" job on the assembly line about as fast as slipping on ordinary washers. For any blind location assembly, the device has the advantages of conventional cage nuts, without the disadvantages of additional metal, additional equipment, extra handling and spot welding, according to the manufacturers. In the case of the snap-in type, it also eliminates the need for different size cages to accommodate different panel thicknesses.

The company reports that this cage nut is produced to fit most popular sizes of sheet metal screws. It is made of spring steel or can be made of mild steel, depending on the torque requirement. The patented conical-shaped impression is formed in the nut to provide a 360° helical thread-grip on the screw thread.

Binocular Magnifier Speeds Production

The Magni-Focuser, a binocular magnifier recently introduced by Edroy Products Co., 480 Lexington Ave., Room 1143, New York 17, N.Y., is proving itself to be a great aid to vision in a wide range of manufacturing operations of a delicate nature where accuracy is essential.

Users in many leading industries have

It's the Grip that Counts



ACME BENCH VISES

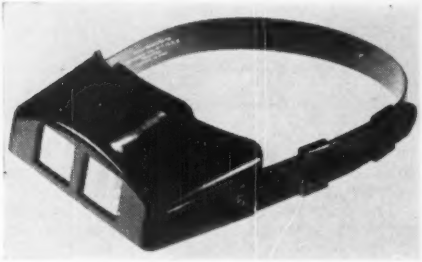
will always grip your work securely without danger of Wobbling or Side Twisting. The even, central pulling action of the spindle assures uniform holding power for either light or heavy pieces. Acme Bench Vises are made in 11 sizes from 2″ to 6″.

ACME COMBINATION PIPE AND BENCH VISES ARE AVAILABLE WITH 3½″ - 4½″ or 5″ JAWS.

ACME TOOL COMPANY

71 WEST BROADWAY NEW YORK 7, N. Y.

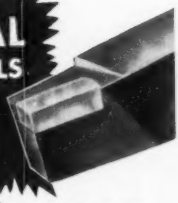
testified as to the Magni-Focuser's usefulness, for example: SKF Industries: "Concentrated and exacting visual inspection of surface finish of balls and rollers . . . measuring small .055" diameter ball blanks." Charles L. Jarvis Co.: "we use these in conjunction with flute grinding . . . very close work and we have found that they materially assist the operator in some of the finer work". General Electric Co.: "Use of the Magni-Focuser consists of high precision machine and assembly work."



On delicate, fine tolerance operations, layout work, gauge reading and surface inspection, tool and die work, instrument work, precision assembly, metallurgical examination, reading of blue prints, tool maintenance, in the drafting room and engineering department, the Magni-Focuser is recommended.

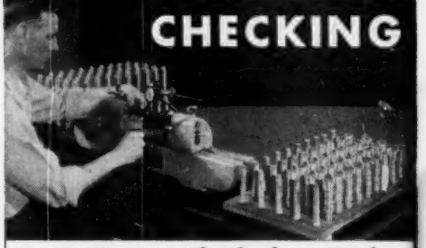
The device leaves both hands free and will fit comfortably over prescription eyeglasses. The instrument provides three-dimensional vision, giving a true perception of depth. It is available in five different focal lengths, from 4" to 20".

KENNAMETAL
CUTTING TOOLS
for Increased
Productivity



KENNAMETAL Inc LATROBE, PA.
CEMENTED CARBIDE TOOLS,
BLANKS, MILLING CUTTERS

Get Better
Production from
PRECISION
CHECKING



Pump Rotors Checked to Within
.0005" on Sundstrand Bench Center

Simplify assembly, lower spoilage and get better production from this modern Sundstrand Bench Center. For instance, this manufacturer of pumps checks the concentricity of the O.D. of the pump rotors within .0005" with the spline and checks side runout with the spline to within .0005". You'll check work between centers easier, faster and within limits of .0001" on this improved Sundstrand Bench Center.

"One-hand control" over all movable elements leaves the operator's other hand free to control rotation of the part being checked. Either headstock or tailstock can be unclamped, positioned and locked in place with a single hand operating the top lever. Investigate this bench center today.

Complete Range as Follows:

6" x 18"	12" x 36"	12" x 60"
6" x 36"	12" x 48"	12" x 72"

FREE Additional Data

covering complete specifications and additional features is contained in this bulletin. Write for your copy today. Ask for data sheet No. 402.



Sundstrand Machine Tool Co.
2535 Eleventh St., Rockford, Ill., U.S.A.

Royersford-Excelsior Bench Type Arbor Presses



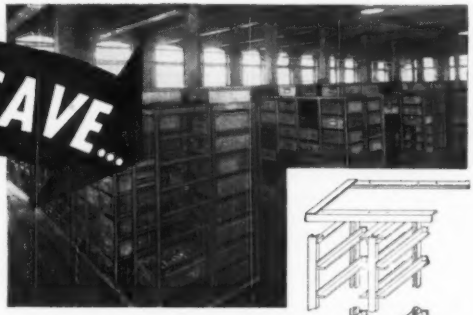


Royersford-Excelsior Arbor Presses, introduced by Royersford Foundry & Machine Co., Inc., Royersford, Pa., have been designed to withstand sever usage. They are made in two styles, the plain lever type, (left hand illustration), and the simple ratchet type (right hand illustration). The lever type is provided in five models, and the ratchet type in two models. The frames of these arbor presses are made of high tensile strength iron with a semi-steel content. The ram and pinion are cut from special tough steel, and the teeth are extra heavy, minimizing breakage and undue wear.

The presses are constructed with a front and side set adjustment so that the ram will be in perfect alignment at all times. Floor stands can be furnished on two models of the plain lever type and on the ratchet type presses. Two models of the lever type and the two models of the ratchet type are equipped with a hand lock which holds the ram in any desired position and keeps it from dropping.

The five plain lever type arbor presses range in tonnage pressure between ½-ton on the No. 0 to 4 tons on the No. 3½. Diameter of work range of the presses is from 7″ on the No. 0 to 18″ on the No. 3½. The ratchet type presses accept work up

RACK'EM and SAVE...



SAVE SPACE *Sterling Racks* utilize rent-free air space . . . keep your parts and tools neat and orderly.

SAVE TIME Materials "filed" in *Sterling Racks* are always available — upper and lower boxes equally accessible.

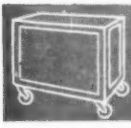
SAVE MONEY *Sterling Racks* cost you about 1/3 less per opening than individual racks.

Sterling Racks and boxes in modern stockroom. These five foot sections are convenient for shipping, assembling, and relocating.

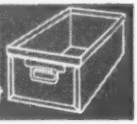
Made to fit your present shop boxes or boxes supplied. Available in five section units of rigid construction—Prompt Delivery. Write today for literature and prices.

Drawing shows how top and bottom frames are bolted to uprights. Racks are shipped knocked-down.

Sterling Factory Equipment Co., 187 Charles St., Providence, R. I.



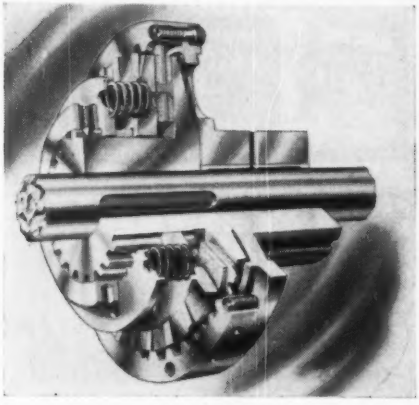
Sterling
Quality Handling & Storage Equipment



to 15¼" diameter on the No. 3R and up to 18" on the No. 3½R. The former has a tonnage range of up to 4 tons, and the latter has an approximate pressure of 5 tons. Complete specifications are contained in a descriptive catalog sheet, available upon request.

Hilliard Offers New Slip Clutch

A new slip clutch has been designed by the Hilliard Corporation, Elmira, N.Y. to meet the problem of maintaining constant tension or constant torque on winding operations. The clutch has wide application in industrial winding uses such as the printing, paper making, plastics, wire and textile industries. It is designed for use also as a safety device for overload protection or to maintain constant torque, regardless of driving speed.



Special features include ventilated plates, cooling fins and pressure springs with long deflection range for accurate adjustment. Single, double and triple plate construction is available. When the function is constant tension, the regular adjusting nut is replaced with a sliding collar to permit adjustment while the unit is in operation.

Some models are constructed with a disc spring and metallic friction plates in a compact design to fit small space. High grade iron or aluminum castings and steel are used for the parts; exposed surfaces can be cadmium plated for corrosion resistance, where necessary.

The clutches are offered in sizes from 2⅜" to 27" diameter with torque range up to 10,000 foot pounds and heat capacity up to 8½ horsepower.



THEY GRIND—NOT JUST RUB!

The RPM's stay up while grinding . . . not only when the grinder runs idle. It is an established fact that surface speeds must stay up to approximately a mile a minute if you want to grind . . . not just rub. Every mechanic knows this, but an inexperienced buyer may order tools that maintain proper grinding speeds only when running idle. The speed of Kipp air grinders drops but slightly when put to work. That means better work . . . longer wheel life.

MADISON-KIPP CORP.

207 Waubesa St., Madison, Wis., U.S.A.

Write for KIPP Air Tool Catalog AT 3006

READING BENCH KEYSEATER

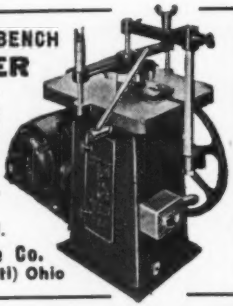
Portable — move directly to job; a time saver for both small and large shops.

3¼" stroke; adaptable for other work.

Low first cost — prompt delivery.

Good dealers wanted.

Reading Machine Co.
Reading (Cincinnati) Ohio





The simplified PYRO Optical is the ideal instrument for direct temperature readings of ANY heated object in your plant. Completely SELF-CONTAINED, PORTABLE, RUGGED, LIGHT WEIGHT (3½ lbs.) and FOOL PROOF. No correction charts, no accessories and no maintenance expenses. Unique design permits temperature determination even on MINUTE SPOTS. Fast MOVING OBJECTS and of the SMALLEST STREAMS.

Write for Catalog No. 80

THE PYROMETER INSTRUMENT CO.
New Plant and Lab., Bergenfield 3, N. J.

SEND FOR FREE CATALOG TODAY



T-NUT & STUD SETS
STEP BLOCK SETS
PUNCH PRESS SETS

QUARTER TURN SCREWS
SHOULDER SCREWS
DOUBLE END JIG FEET
SCREW TYPE JIG FEET
PRESS TYPE JIG FEET
FLANGED NUTS
CUT THREAD STUDS
TEE-NUTS
COUPLING NUTS
ADJUSTABLE STEP BLOCKS
STAR TYPE HAND KNOBS
HEXAGON TYPE HAND KNOBS
KNURLED HEAD SCREWS

Northwestern
118 HOLLIER AVE., DAYTON 3, OHIO



Remove burrs!
Chamfer holes!

NOBUR TOOLS

Industry's unmatched tool for
FAST, COST-REDUCING PRODUCTION

WRITE TODAY
NOBUR MANUFACTURING CO.
717 North Victory Blvd., Burbank, Calif.



STAMPINGS IN SMALL LOTS

Precision Die Made — Lowest Possible Cost.

DAYTON ROGERS MFG. CO.
Minneapolis 7, Minn.

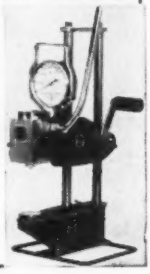


KING PORTABLE BRINELL

for all HARDNESS TESTING. Throat 4". Gap 10". Wt. 27 lbs. — ACCURATE

Puts actual load of 3000 KG on 10 mm. ball.

Test head removable for testing very large parts.



ANDREW KING
521 Broad Acres Road
Narberth, Pa.

CAMS

Our ROWBOTTOM cam cutting facilities are at your disposal for your cam requirements.

We solicit your inquiries.

BLOOMFIELD TOOL CORP.
36 FARRAND ST. BLOOMFIELD, N. J.

ATLANTIC GEARS



SPUR-SPIRAL-WORM-BEVEL GEARS GENERATED WITH PRECISION ON MODERN EQUIPMENT-SEND SAMPLES OR BLUEPRINTS FOR QUOTATION!

ATLANTIC GEAR WORKS, INC
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CA 6-1440

"Colmonoy takes the roughest use possible!"



"We use Colmonoy No. 6 rod to build up wear strips and spots on our deep-hole drills. In constantly forcing the drill head to run true, these surfaces take the roughest usage possible. Colmonoy stands the terrific stresses, the abrasion and the hard metal-to-metal wear that takes place while chewing a hole several feet long through solid steel. It resists distortion and because is has a low co-efficient of friction, there is no pick-up or galling. It's the best material for our job."

This is what Conner Tool and Cutter Company, deep-hole drilling experts, say about Colmonoy. One of their drills, Colmonoy wear-stripped, is shown above.

Colmonoy is a complete line of hard-facing alloys, covering every need. For longer resistance to any kind of wear, check Colmonoy for the right alloy.

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WALL COLMONOY

CORPORATION

HARD FACING ALLOYS

19345 JOHN R STREET DETROIT 3, MICHIGAN

Make A Clean Impression!

Hand-Cut STEEL STAMPS

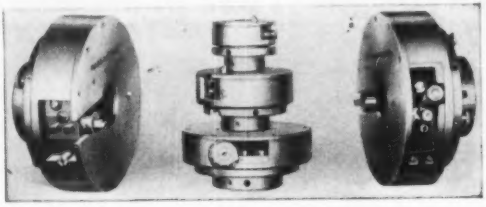
Letters & Figures



Deep, hand-cut letters in special-formula steel assure clean impressions and long service. Face of stamp is angled for extra strength. Chamfered corners for locating the base. Ask for Hoggson Brand at mill supply houses.

HOGGSON BRAND
Since 1849

HOGGSON & PETTIS MFG. CO., 141-H BREWERY STREET NEW HAVEN, CONN.



MUMMERT-DIXON

FACING HEADS

with Automatic Feed

One-way Tool Feed — 6, 9 and 10" sizes.

Two-way Tool Feed — 9, 12, 16, 20, 24, 30, 36, 40 and 46" sizes.

Save many costly set-ups.

Bulletin No. 4141 Gives Full Details

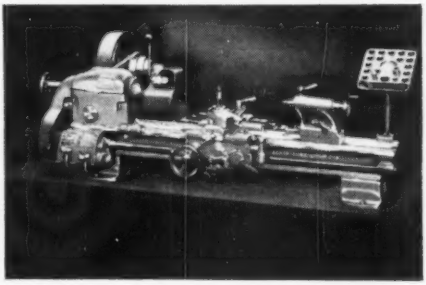
MUMMERT-DIXON CO., 122 Philadelphia St., Hanover, Pa.

South Bend Toolroom Lathe

A new line of small precision toolroom lathes is introduced by the South Bend Lathe Works, 426A E. Madison St., South Bend 22, Ind. Known as the "Light Ten", these lathes take work up to 10" in diameter over the bed. The swing over the cross slide is 6¼", and the distance between centers varies from 16⅛" to 28⅛", depending on the bed length. Driven by a ½ h.p. motor, ample power is provided for all work within the capacity of the lathe. The headstock is back geared, providing spindle speeds ranging from 48 to 1435 r.p.m.

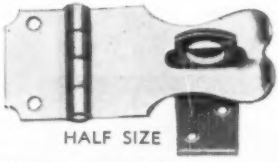
Designed primarily for precision toolroom work, this new lathe is said to take less power and space than larger, heavier sizes and will perform as well or better on work within its capacity. Large handwheels, micrometer graduated feed collars, and convenient controls reduce operator fatigue. It is equipped with a precision lead screw having .0015", or less, lead variation in any one foot; a handwheel draw-in collet attachment (less collets); collet rack; taper attachment; thread dial indicator; thread cutting stop; large face plate; and a micrometer carriage stop.

The tailstock spindle has 1/10" graduations and tailstock screw has micrometer collar reading in thousandths. Regular equipment includes power feed apron; graduated compound rest; tool post; two 60-degree centers; headstock spindle center sleeve; and a quick change gear



box providing a thread cutting range of 48 pitches, 4 to 224 per inch R.H. or L.H., and 48 longitudinal power feeds.

Bed length of 3, 3½, and 4-feet are available with maximum distances between centers of 16⅛", 22⅛" and 28⅛"



HALF SIZE

HASP & STAPLE

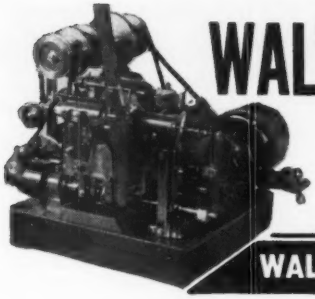
S & S

WITH OR WITHOUT HOLES

Butts and Continuous Hinges for Cabinets, Cases, etc.

S & S HINGE AND METAL PRODUCTS CO.

4725-4735 IOWA ST. DEPT. B CHICAGO 51, ILLINOIS



WALTHAM PINION AND GEAR CUTTING *Machines*

These machines are finished according to the work to be done. Send samples or dimensioned drawings and tell us about the cutting qualities of the material and probable production per week or month. Then wait for our reply with bulletin.

WALTHAM MACHINE WORKS WALTHAM 54 MASSACHUSETTS

respectively. No. 2 Morse taper centers are used in the headstock and tailstock spindles. Maximum collet capacity is 5/8"; hole through spindle 27/32"; swing over bd 10", over saddle wings 9-15/16", and over saddle cross slide 6¼"; tailstock spindle travel is 2⅛"; tailstock top set over 5/8"; cross slide travel is 5⅞"; and angular feed of compound rest 2¼". Headstock, carriage, and tailstock are hand-scraped to fit the bed ways. South Bend prismatic bed way design is used, the ways being hand-scraped their entire length.

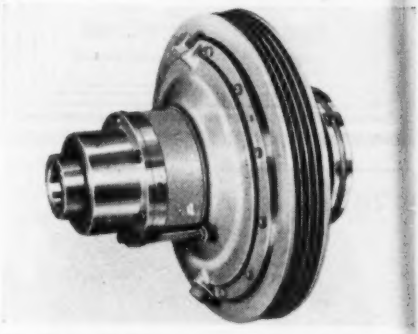
MACHINE TOOL QUIZ

Answers to quiz from page 170

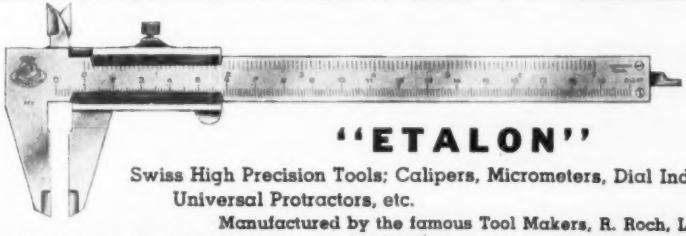
1. Turret Lathe
2. Radial Drill
3. Welder
4. Automatic Lathe
5. Screw Machine, Swiss type
6. Shaper
7. Drill
8. Milling Machine
9. Planer
10. Contour Projector

Vickers Magnetic Particle Clutch

The first commercially-usable magnetic-particle clutches have been introduced by the Vickers Electric Division, Vickers, Inc., 1815 Locust St., St. Louis, Mo., with



its line of Magneclutches and Magnebrakes. First developed for use by the Navy for more efficient operation of shipboard equipment, these devices are now in production for use by industry



No. 17

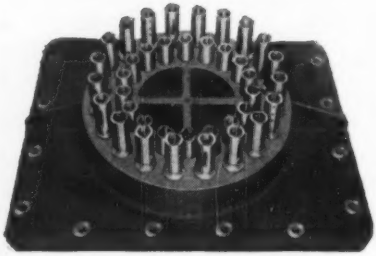
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Manufactured by the famous Tool Makers, R. Roch, Ltd.

ALINA CORPORATION 32 Broadway New York 4, N.Y. Exclusive Representatives WH. 4-4088

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THE PRECISION
CHOICE OF WORLD-
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1900 - 50th - 1950
Anniversary
REID BROTHERS CO., INC.
Beverly • Massachusetts



Pictured: a 38-Spindle Heavy-Duty Drill Head

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MANUFACTURERS OF
MULTIPLE DRILLING EQUIPMENT
We invite your inquiry.
MICHIGAN DRILL HEAD CO.
971 E. 8 Mile Road Hazel Park, Mich.

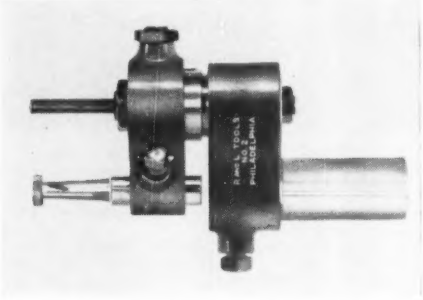
for control of torque, speed and position.

The Vickers Magneclutch is a controllable coupling which utilizes the linking action of a dry magnetic mixture in a magnetic field between driving and driven parts in order to transmit torque. The magnetic mixture is composed of iron particles and flake graphite. The magnetic field is established by current flowing through a coil; by varying the current, the degree of clutching can be controlled.

Design and operating advantages of the new unit which indicate its widespread usage throughout industry include: small control power with rapid response, no wear on torque transmitting surfaces, torque at zero slip, large maximum to minimum torque ratio and easy adaptation to remote control.

R & L Recessing Tool

An entirely new design of recessing tool which can be adjusted to operate on any internal diameter with the capacity of the machine has recently been developed by R & L Tools, 1825 Bristol St., Philadelphia 40, Pa. This new tool, illustrated below, can be adjusted to operate on outside diameters for cutting grooves or



similar operations such as chamfering or cutting clearance at the end of threads.

The R & L Recessing Tool is also easily adjusted to operate with the machine spindle running either right or left handed, with the pressure on the cutter downward, giving steadier action on the cutting tool. The device is available in three sizes, Nos. 00, 1 and 2. The No. 00 has a 1½″ shank length, ⅝″ diameter shank, and a 1¼″ length of body. The No. 1 has a 2″ shank length, ¾″ diameter shank and a 1½″ body length. The No. 2 has a 2″ shank length, 1″ diameter shank and a 2¼″ length of the body.

Beverly THROATLESS SHEAR

Cut any Shape... STRAIGHT OR IRREGULAR



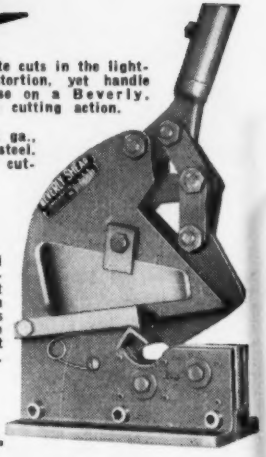
MODEL B-3 with Ball Bearing Hold Down

Make straight or intricate cuts in the lightest metals without distortion, yet handle heavier gauges with ease on a Beverly. Smooth, powerful, clean cutting action.

Made in 4 sizes to handle 18 ga., 14 ga., 10 ga., and 3/16" mild steel. H.C.H.C. Blades available for cutting stainless steel.

NEW WIRE ROPE AND CABLE CUTTER

Cuts wire rope and heavy electrical cable at one stroke. Circular cutting action assures finished cut at one stroke. Snap-Actien Hold Down permits instantaneous adjustments for varying sizes. Capacity: wire rope 11/16"; aperture 1". Weight 30 lbs.; base dimensions 8" x 5".



Write for illustrated circulars on Beverly Cost Cutting Tools.

BEVERLY SHEAR MFG. CO., 3005 W. 111th St., Chicago 43, Ill.

CHICAGO "SAFETY PLUS" SOCKET SCREWS MAKE YOUR PRODUCT BETTER 4 WAYS

- **THEY'RE STRONGER**—They fasten products MORE securely—give a sturdier, tighter "hold".
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- **MORE ACCURATE**—They're consistently more accurate in dimensions, have sharper, smoother, truer threads, start in easier the first time.
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There is a Chicago "Safety Plus" Product designed to give you a tighter, lower cost fastening for ANY heavy duty purpose.

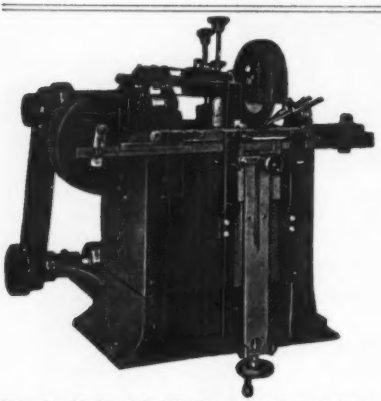
FIND THE TYPE YOU NEED FROM THIS LIST:

Socket Head Cap Screws • Socket Set Screws • Stripper Bolts • Square Head Dog Point Set Screws • Socket Pipe Plugs • Keys • Hexagon Head Cap Screws, Steel and Brass • Square Head and Headless Cup Point Set Screws • Fillister and Flat Head Cap Screws • Taper Pins • Milled Studs • Semi-Finished Hexagon Nuts, Steel and Brass • Hexagon Castellated Nuts.

Service-conscious Industrial Supply Distributors EVERYWHERE carry complete stocks of Chicago "Safety Plus" Products. To speed delivery time, call the one nearest you.

The CHICAGO SCREW COMPANY

2507 WASHINGTON BLVD., BELLWOOD, ILL. • *Established 1872*



Wardwell Model EC Combination Grinder. The only single unit grinder adaptable for hack, band and circular saws that does not depend on the shape of the grinding wheel to form the shape of the tooth. This unique feature enables operator to grind a variety of blades without dressing or changing wheels.

HACK SAW BLADES
last 6 times longer

Instead of discarding hack saw blades put them back in use by resharpening them. Not one or two resharpenings but as many as 6 resharpenings are possible when the EC is used.

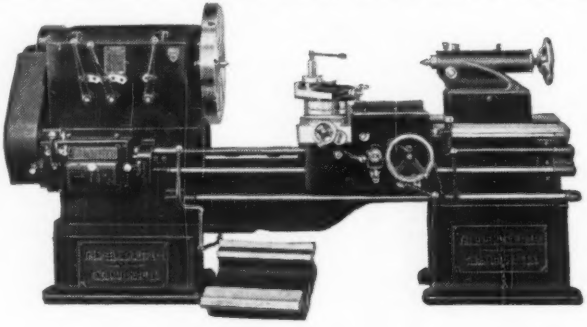
This machine actually pays for itself in the savings on blades alone. But more important is the exceptionally fine cutting edge it gives to old blades, actually much better than new. Blades are keener and longer lasting. Wardwell EC wheel will not burn, anneal or injure hardness of teeth. Sharpens circular, hack or band saws on one machine.

Write for Bulletin EC today.

THE WARDWELL MANUFACTURING CO.
3165 Fulton Rd. - Cleveland 9, Ohio

NEBEL Removable Block Gap Lathes

furnished in the Geared Head Motor Driven Type, 3 Step Cone Double Back Gear Belt Driven Type or with Motorized Headstock. Especially adapted for repair and maintenance as well as for general manufacturing. Handle a large variety of work with large swing through the gap.



All Geared headstock type completely equipped with Timken Bearings, with motor mounted on rear of lathe. Quick change gear box, compound rest, steady rest, chasing dial, face plate, driver plate, wrenches, tool post and centers.

Furnished in four different sizes as follows: Series "LN" 18/27", Series "AA" 20/30", Series "B" 22/33", and Series "D" 25/40".

Write for Circular Giving Complete Information

THE NEBEL MACHINE TOOL COMPANY
CINCINNATI 25, OHIO

CRAFT-HOLLOW *Disc-ette*

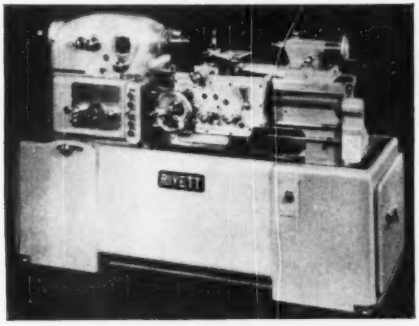
Precision light weight disc grinder for grinding, shaping, finishing 12,000 R.P.M. 4½ pounds. Held in palm of hand without use of handles, knobs, etc. G.E. motor. Completely ball bearing. Spiral bevel steel gears.
7 discs: 3 composition, 36, 80 and 150 grit. 4" dia., 3/32" thick
2 fibre backed aluminum oxide, 24 and 80 grit. 4" dia.
2 cloth backed aluminum oxide, 60 and 100 grit. 4" dia.
Complete with wooden case. Only **$59.50**
Order today.



CRAFT-HOLLOW INDUSTRIES
WALLINGFORD PENNSYLVANIA

Double-Duty Toolroom Lathe

A new precision toolroom lathe designed to provide increased power and ruggedness is now being offered by Rivett Lathe & Grinder, Inc., Brighton 35, Boston, Mass. Recommended for both sensitive instrument work and heavy-carbide



cutting, the new Model 1020S is constructed to handle any toolroom turning within its 12½" swing and 20" centers.

Contributing to the power of the new lathe are: a 40% heavier weight of 4,000 lbs.; a headstock back-gearing at speeds ranging from 22 to 400 r.p.m.; and a bed with 12¾" wide steel ways, uniformly hardened to 60 Rockwell C. scale.

Features adding to the precision of the Model 1020S are; a three bearing spindle mounting; a free spindle by direct belt drive operating at infinite speeds up to 3600 r.p.m.; collets mounting directly in the spindle without adaptor; hardened and ground feed screws; anti-friction bearings throughout; and, a gear box providing 72 feeds and 84 threads including every world standard.

Operating convenience is gained by push button controls for the variable speed drive and the electric carriage, a neutral clutch to stop the spindle without stopping the drive, a convenient handwheel for turning the headstock spindle.

Photoelectric Smoke Detector

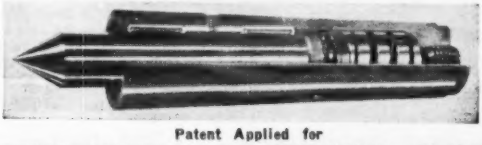
Photoswitch Inc., 77 Broadway, Cambridge 42, Mass., announces a new photoelectric smoke detector for air conditioning duct systems. It is recommended for use in stores, theatres, hotels and other locations where the presence of smoke

IT PAYS TO USE "NIROL" LIVE CENTERS — HERE'S WHY:

It's a rugged, simplified designed precision live center permitting perfect support of all loads and thrusts. Reduced overhang adds rigidity and increases machine capacity. Compensating factor provided for work expansion from heat while machining.
Has met with hearty approval of machinists and shop men.

Morse Taper Sizes:
No. 2 ..... $21.75
No. 3 ..... 26.75
No. 4 ..... 32.50
No. 5 ..... 49.75

Other sizes and prices upon request

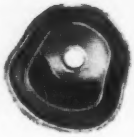


Patent Applied for

Increases Production
SAVES TIME
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L. F. TREICHLER — PRECISION GRINDING
900 ROUTE 29 NORTH PLAINFIELD, N. J.

EISLER CAM JIG BORING • MILLING





A SPECIALIZED ROWBOTTOM CAM MILLING SERVICE... JIG BORING... SPOT WELDING... CONTRACT PRODUCTION ... EXPERIMENTAL DEVELOPMENT

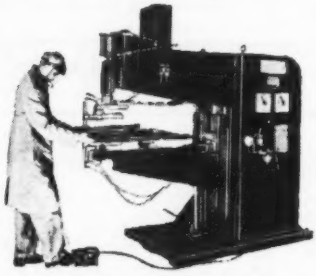




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RESISTANCE WELDERS
SPOT • BUTT • GUN • SEAM

For all types of welding in sizes: ¼ to 300 KVA. Foot, air or motor operated.



We invite contract spot or butt welding in large or small quantities.

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762 South 13th St., (Near Avon Ave.)
Chas. Eisler, Pres.
Newark 3, N. J.

YOUR DIAMOND WHEELS
PRODUCE FAR BETTER FINISHES IF CORRECTLY LUBRICATED and THE CORRECT LUBRICATION IS
STADOIL



SINCE 1935 the standard of performance for all diamond wheel and lap lubrication.

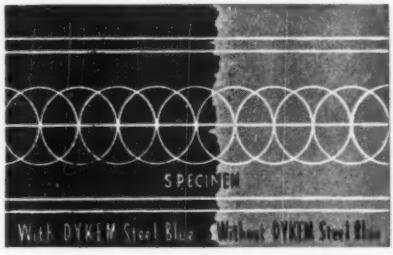
YOUR DIAMOND WHEEL MANUFACTURER WILL TELL YOU SO. Greater wheel production and far longer wheel and tool life.

ORDER through your Mill Supply or Industrial jobber and GOOD JOBBERS will NOT sell you an imitation of the results Stadoil will produce.

Half-pint size to 50 gallon drums

Manufactured only by

STADOIL MANUFACTURING CO.
El Monte, California

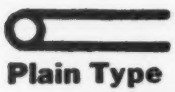


DYKEM STEEL BLUE
STOPS LOSSES
making dies & templates

Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed layout lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

Write for full information.

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2301G North 11th St., St. Louis, Mo.


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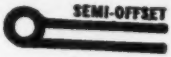
CONTINUOUS HINGES

All hinges shown can be furnished with special holes, cutouts and bends to blue-print in metals to suit the job.

AUTO MOULDING & MFG. CO.
1110 E. 87TH ST.
CHICAGO 19, ILL.

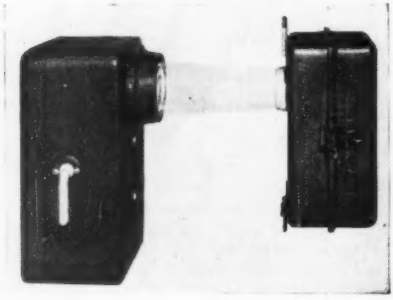
SPECIFICATIONS:
Open width 7/8" to 6"
Gage Material .040 to .125
Pin Diameter .101 to 3/8
Lengths to 120"


THREE-FOURTHS OFFSET.


SEMI-OFFSET

is a hazard to property or a possible cause of panic.

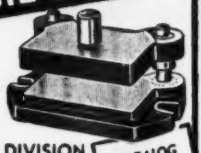
Duct systems have the inherent danger of spreading smoke and fire quickly throughout a building and in some instances have actually drawn a fire from the outside through the air intake systems.



The purpose of this control is to detect the presence of smoke. At the first sign of smoke, Photoswitch Smoke Detector Type A28E operates, and through auxiliary relays (not included) may automatically turn off blowers, close automatic shutters and signal the maintenance department.

Among the features of this system are a sensitive photoelectric circuit with fail-safe circuit design and a tamper-proof sensitivity control to prevent unauthorized adjustments. The system has an operating range of from 5 to 30 feet. The supply voltage is 115 volts, 60 cycles, a.c. Relay contacts are single pole, double throw. Contact ratings are: 3 amps., 115 volts, a.c., 1.5 amps., 230 volts, a.c., non-inductive.

DANNEMAN Precision DIE-SETS



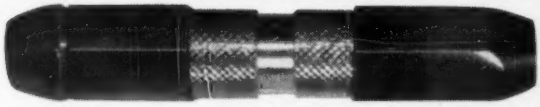
Precision-Bored on Master Plates

DANNEMAN DIE-SET DIVISION
ACME-DANNEMAN COMPANY, Inc.
201 Lafayette St. New York 12, N. Y.

CATALOG ON REQUEST

COLLET TYPE PIN GAGE HANDLE

(Bushings for cylindrical and thread plug gages)

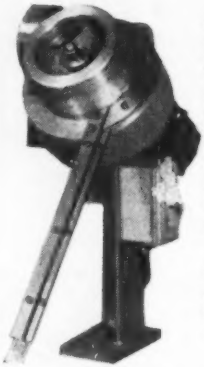


RED GREEN

• Complete line of gage supplies, handles, blanks, ring gage parts, insulator grips, etc. from stock. *Get our prices first.*

HURON MACHINE PRODUCTS • 14831 W. Warren • Box 146 • Dearborn, Mich.

Reynolds AUTOMATIC HOPPER FEEDS



Eliminate costly handling operations by delivering part automatically to work position. Parts poured into the motorized hopper are arranged and fed as required.

Several types available suitable for feeding a wide variety of parts.

Send sample of part to be fed when writing for quotation.

COOK & CHICK CO.
640 S. MILLER ST. CHICAGO 7, ILL.

Amazing
FOR TAPPING AND REAMING



You'll be amazed at how easy it is to align the work with the spindle if you use a Ziegler Tool Holder which compensates for inaccuracies up to 1/32" on the radius or 1/16" on the diameter.

No wonder the Ziegler Holder is in general use in shops which keep a watchful eye on production costs.

W. M. ZIEGLER TOOL CO.
13570 Auburn, Detroit 23, Mich.

WRITE FOR CATALOG

Ziegler ROLLER DRIVE FLOATING HOLDER for Taps and Reamers...

Medelton Motor Driven Poweroll

Wm. Halpern & Co., Inc., 53 Park Place, New York 7, N. Y., introduces the "Medelton Motor Driven 'Poweroll'." It is a sturdy efficient coil cradle capable of solving all problems of handling strip metal in coils, according to its manufacturers.



The device features fast loading; one man loads by swinging the switch actuator arm out of the way and by rolling a heavy coil up the ramp onto the power-driven rollers where it automatically centers itself. The separator plate, which is instantly adjustable, needs only to be set to the width of the first coil of a run and not touched thereafter. Merely snapping the actuator arm back into position and bringing the end of the material around it, readies the machine for use. This entire procedure is usually accomplished by one man in less than one minute.

The slack loop of the coil is automatically maintained by the "Poweroll" coil cradle, which uncoils only what is needed and no more. This results in greater accuracy for feeds and less fatigue for operators since no pulling is required, only feeding. The cradle operates efficiently close to the press, thus a minimum of floor space is required.

Rigid construction, oversize electrical equipment, high torque motor, and oversize bearings, give the "Poweroll" coil cradle a long troublefree life. The sim-

plicity and speed of loading, the elimination of hazardous lifting in order to load reels, the increased efficiency which is a direct result of the automatic slack loop maintained, results in higher production.

Two sizes are offered; one size accommodates coils up to 10" wide, 800 lbs. capacity, with a ¼ h.p. capacitor motor, and another takes coils up to 12" wide, of 2000 lbs. capacity, with a ½ h.p. capacitor motor.

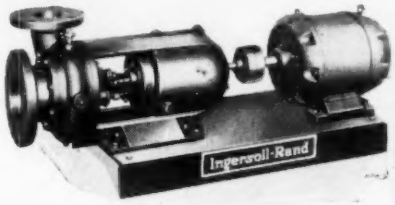
Cradle-Mounted Centrifugal Pump

Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y., announces the publication of a new four-page flier describing its new line of cradle-mounted centrifugal pumps. The bulletin shows a sectional view of the pump with all of its salient features described. In addition the various types of drives are illustrated.

The pump itself incorporates all of the job-proven features of the Ingersoll-Rand Motorpump, including deep water-cooled stuffing box, smothering gland, ring oil lubricated ball bearings, a heavy cradle shaft and bearing, sturdy channel steel baseplate and an all metal coupling.

The impeller is of the latest hydraulic design, mechanically and hydraulically balanced. An extra deep stuffing box accommodates five or more packing rings and due to the side-opening cradle it is easily accessible.

The pumps are built in 5 different sizes, single and two stage. Sizes range from ¾" to 5" discharge with capacities up to 1600 g.p.m., and heads up to 250 feet. Normal horsepower range is from ¼ to 75.



The pumps may be driven by direct electric motor, electric motor and V-belt, turbine through reduction gears, direct turbine, V-belt gasoline engine or direct gasoline engine.

Due to the flexibility and ease of changing drivers, the pumps are suitable for paper mills, chemical plants.



REPLACE OLD COOLANT SYSTEMS, CONVERT "DRY" MACHINE FOR WET CUTTING WITH NEW, HUSKY GRAYMILLS COOLANT SYSTEMS.

They're made for 'round the clock operation, pumping coolants or heavy oils.

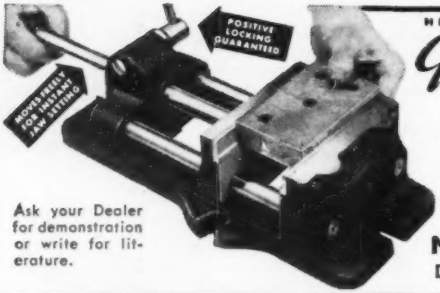
Above model G4-2-04 installed in 5 to 20 minutes, delivers enough coolant for 6 to 8 spindle press. It is one of many complete Graymills Coolant Systems which will help you reduce tool costs; increase cutting speeds and improve quality.

Used on all types of machine tools, New Improved Graymills Coolant Systems are priced from $44.50. Gear and centrifugal pumps are 1/25 to ½ HP. 1 gal. to 70 g.p.m. Tanks 1 gal. to 38 gals. Fittings and recovery pans available.



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GRAYMILLS CORPORATION Evanston, Ill.



Ask your Dealer for demonstration or write for literature.

HEINRICH
GripMaster
SCREWLESS VISE

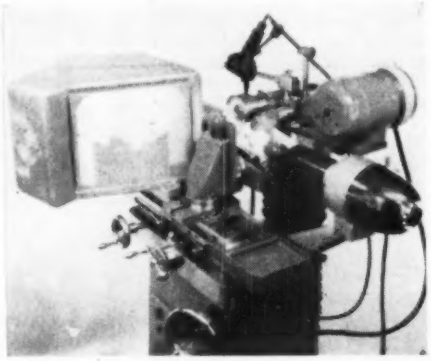
GRIPS WITH SPEED CUTS TOOLING COSTS

Step up drill press production with the Heinrich "Grip-Master" Screwless Vise—with the patented "Circle Grip" hammer blows cannot break. Work is automatically leveled; jaws set instantly, effortlessly. 3", 4", 6", 8" jaw widths; ideal as base structure for drill jigs and fixtures.

NATIONAL MACHINE TOOL CO.
DEPT. 100-M • RACINE, WISCONSIN

Optical Profile Grinding Attachment

A new Optical Profile Grinding Attachment has been introduced by Nife, Inc., 165 Broadway, New York 6, N. Y.



According to the manufacturers, this device can be assembled on the Nife Universal Tool Grinder in just a few minutes.

The unit consists of a projector, a 12" x10" screen, a special work holder (on which can be mounted either the dividing head or the swivel vise), and a motor which drives the table at approximately 100 strokes per minute. Optical profile grinding eliminates the errors which are caused by reshaping the wheels, as well as doing away with the time and expense of making templates.

The new Optical Profile Grinding Attachment has a magnification of 10x; its reading accuracy is said to be less than .001". The adjustable table movement of the unit is from ¼" to 1-3/16".

Plastic Injection Molding Machine

Convenience and speed in the plastic injection molding of small units, such as parts, buttons, novelty items, etc., and equally useful for die tryout work, are features of the new ¾ ounce injection molding machine, Model No. HC-75., introduced by Moslo Machinery Co., 2443 Prospect Ave., Cleveland 15, Ohio.

This machine is a completely self-contained unit, using a hydraulic system for injection. A mechanically operated toggle-clamp provides maximum clamping pressure. A simplified knockout arrangement is incorporated in the clamp assembly, and a built-in chute for the discharge of molded objects is included.



A REAL HELPING HAND

It's a help that die makers, tool makers, machinery builders and general machinists have long sought—a more accurate and surprisingly faster way of transferring blind screw holes.



The Heimann Transfer Screw Set is a self-contained, complete tool. No wrenches or pliers are necessary. Made in 1/16" to 1" diameters. *Send for price list.*

HEIMANN MFG. CO.
332 Lincoln Ave. Urbana, Ohio

The machine handles the complete variety of thermoplastics, and can also be supplied for molding nylon. Where the machine is to be used for molding nylon as well as thermoplastics, the manufacturer recommends the purchase of a complete interchangeable cylinder and heater assembly for 550 watts, 110 volts A.C. This assembly includes a stainless steel cylinder, torpedo, filter and nozzle with nose heater.



Down-time on the machine itself can be saved through the purchase of an interchangeable heater and cylinder assembly unit, facilitating the changing from one color to another, or from one type of plastic to another.

The rate of injection of this machine, with the injection ram, which is ¾" in diameter, is 0.44 cu. in. of material per second, with a plasticizing capacity of 5.5 pounds per hour. The maximum pressure on oil is 1200 p.s.i. and pressure on the material is 8600 pounds. The injection cylinder is of alloy steel heat treated, and equipped with a spreader.

The mold size (length, top width and height) is 6" x 5" x 5", and maximum casting area is 6 sq. in.

The injection cylinder heater is equipped with a 550-watt heater assembly, and the power consumption of the heating unit when plasticizing to full capacity is approximately 6 amperes per hour at 110 volts. The motor (100/1/60 or 220/440/3 phase 60 cycle, with starter) is 1 h.p. with a r.p.m. speed of 1800-60 cycle and 1500-50 cycle.

TORNADO®

Portable Electric Blower

high speed blast blows away debris quickly, easily!

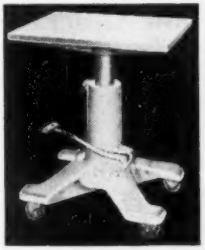
Clean, dry air cleans all kinds of machinery and equipment. Low cost. Reduces breakdowns. Converts into portable Vacuum Cleaner.

FREE! Bulletin 579

BREUER ELECTRIC MFG. CO.

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PORTABLE
ELEVATING TABLE



Saves TIME and LABOR

Eliminate heavy lifting and cut handling costs. Slight foot pressure varies height up to 15½", leaving operator's hands free. Table swivels and locks in any position.

SEND TODAY FOR ILLUSTRATED CATALOG NO. 2

MIDWEST TOOL & ENG. CO.
112 WEBSTER ST., DAYTON, OHIO

Gage Checks Internal Groove Diameter

The self-positioning Dial Groove Gage accurately measures internal groove diameters and recesses used for precision retaining rings of the Truarc type, ordinary snap rings, O-rings, oil and washer



grooves, etc. It is a recent development of Nilsson Gage Co., Inc., Poughkeepsie, N. Y.

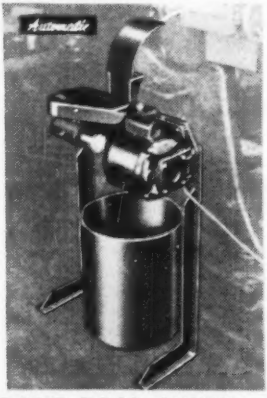
The nose of the gage has two extensions. The upper extension is provided with a gaging pin, set between two prongs of a patented one-piece plunger. The two prongs, having a 60° chamfer and a flat edge slightly less than the groove width, center the pin in the groove and position the axis of the pin through the exact center of the bore. The lower extension—with a fixed gaging insert—is pulled in by a trigger, when inserting the nose into a housing. Releasing the trigger locates the groove almost instantly. The dial indicator—in .0001, .00025, or .0005 mm. calibrations—is stated to give a quick, accurate reading.

Each size gage can be set by a simple vernier within a wide range of diameters. Changing the setting does not change the spring tension on the gaging pin. Setting can be made with gage block combinations, micrometers, or master ring gages.

Norton Semi-Automatic Valve Grinder

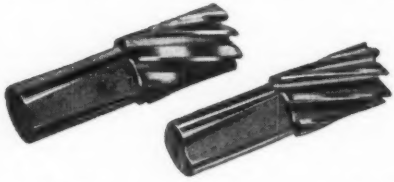
A new, semiautomatic valve grinder is announced by Norton Company, Worcester 6, Mass. The new machine is designed to meet the needs of the automotive and aircraft industries for a valve grinding machine which combines high speed production with semiautomaitc operation, high precision, and fine finish.

Reduce scrap handling cost . . .
Get MORE for your cut scrap . . .
with the
—DURANT SCRAP CHOPPER—



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Rutland reworked or repaired cutting tools are guaranteed to give new tool performance — at a fraction of the new tool cost.

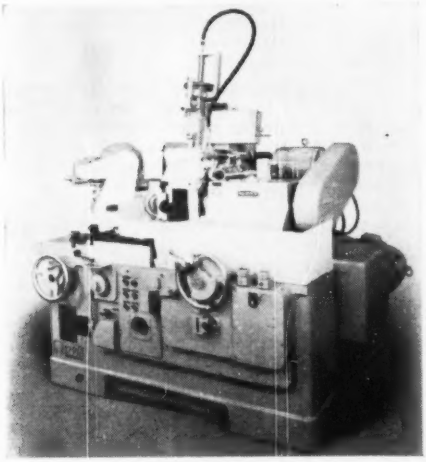
Recutting • repairing • replacing Carbide tips. Special tools from obsolete or standard tools, etc.

Call or Write

Rutland TOOL SERVICE
1617 E. McNICHOLS • DETROIT 3, MICH.
TWinbrook 3-6240

This new machine grinds the faces of automotive and aircraft type valves having face angles of 0 through 62½°, with face diameters of 7/16″ through 3½″, and with stem diameters up to and including ¾″.

For maximum operating ease and production, the grinding cycle functions under semiautomatic control. The operation is confined principally to loading the machine and to movement of a single control lever.



A means is provided for obtaining an ultra-fine feed rate in the final automatic feed stage for assurance of fine finish. A simple adjustment provides for this fine feed becoming operative at any point in the wheel feed cycle from .005″ oversize to zero. Spindle reciprocation is also a feature contributing to quality of finish and improved wheel cutting action.

Termination of the grinding cycle on completion of the grind is brought about automatically by an electric timer set for the particular time period necessary to obtain the size and finish desired.

The work head unit swivels through an arc of 67° on a swivel plate having micromatic adjustment. This plate is mounted on a sliding table, and movement of the unit into grinding position, or movement of it away to provide clearance for wheel removal, is accomplished by a handwheel.

Wheel truing is done by means of a wheel guard truing device which eases and speeds this function. This device operates automatically and at the will of the operator, through hydraulic power.

TORNADO®

one stroke
positive
wet or dry
pick up!

INDUSTRIAL
Vacuum Cleaner



Heavy duty, for instant, thorough cleaning. Picks up water, machine oil, moisture, dirt, grime. Long life. Many attachments. Easy to operate.

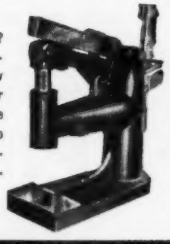
FREE! Bulletin 600

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HIGH SPEED Automatic
STAKING MACHINE

High costs getting you down? You'll find an easy cost-cutting solution with the new HIGHSPEED for staking or riveting fixed and movable joints. Foot treadle, easy to operate, adjustable, safe, uniform hammer blow. Send today for free folder.





COLD RIVETERS

What's your riveting problem? Just send samples of your work completed to the fastening stage. A careful study will be made by our engineering staff and recommendations will be sent to you without charge or obligation. Take advantage of this opportunity by writing now to:

HIGH SPEED HAMMER CO., INC.
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Ernst Portable Hardness Tester



A new, portable, direct-reading Ernst Hardness Tester is being distributed by Newage International, Inc., 521 Fifth Ave., New York, N. Y. It is an entirely new unit, built to meet the demand for a tester that can be conveniently carried and handled, permitting at the same time, a direct and accurate reading without the necessity of referring to conversion scales or calculations. The tester enables taking "at-the-job" direct readings of any shape or form of metal, regardless of the size or width of metal. It allows fast testing of repetitive or assembly line work by unskilled labor. It contains no screw attachments.

In use, hand-grips on the side of the instrument are pressed downwards to lower the indentor so that its point penetrates into the surface of the material being tested under the action of a calibrated helical spring exerting a constant load of 15½ lbs. The movement of the indentor into the material is magnified about 3000 times by the method of displacing liquid from a container into a capillary tube. The tube is supported in a recess and encircles the scales so that the final position of the liquid indicates the hardness value directly. The liquid is colored green to facilitate reading, and contains anti-freezing salts in solution.

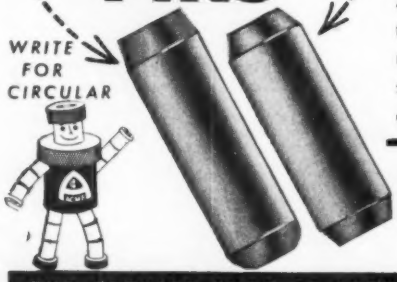
The instrument can be used on curved as well as on flat surfaces, provided the radius of the curve is not less than 3/32". The overall dimensions are 3" high, 2½" diameter. It is packed in a case 6" x 3¾" x 3½". Net weight is 30 ounces.

Direct readings of hardness on visible scale to Rockwell, or if required, Brinnell, Diamond Pyramid, or Tons of Tensile. The performance of the instrument is not affected by temperature variation. Standard instruments high range are 25-65 Rc. Medium range, 35-75 Rockwell A or 100-440 Brinnell. Low range, 50-260 Brinnell.

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RED OR BLUE LABEL
PRECISION
DOWEL
PINS

SAFEGUARD
EXPENSIVE DIES AND
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Acme Dowel Pins break before bending or mushrooming—thus saving expensive equipment from ruin through misalignment. Order standard sizes from stock. Attractive prices on special sizes and large quantities.

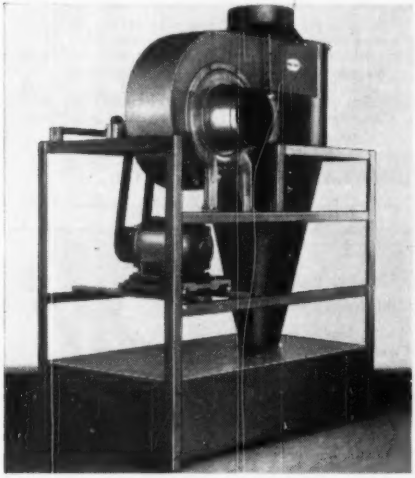
Acme Industrial Company
Makers of Standardized Jig & Fixture Bushings
210 N. LAFLIN ST. CHICAGO 7, ILLINOIS

THE SERVICE SHOP TO INDUSTRY FOR MORE THAN 25 YEARS

The load and application are similar to Diamond Pyramid machines. For convenience of use, the scale has been graduated to Brinnell conversion figures, a more universal scale. Instruments, however, can be supplied to Diamond or Rockwell scales, upon order. Write for new Bulletin ET-100.

Pre-tested Dustkop Dust Collector

Designed for separating industrial dusts from the air stream and discharging cleaned air and toxic fumes out-of-doors, the Model 90N50 Dustkop Dust Collector is announced as a standard, pre-tested, unit made by Aget-Detroit Co., 205 Main St. Ann Arbor, Mich This newest addition to the Dustkop line can be put into operation and with predictable results according to the manufacturer. Thus

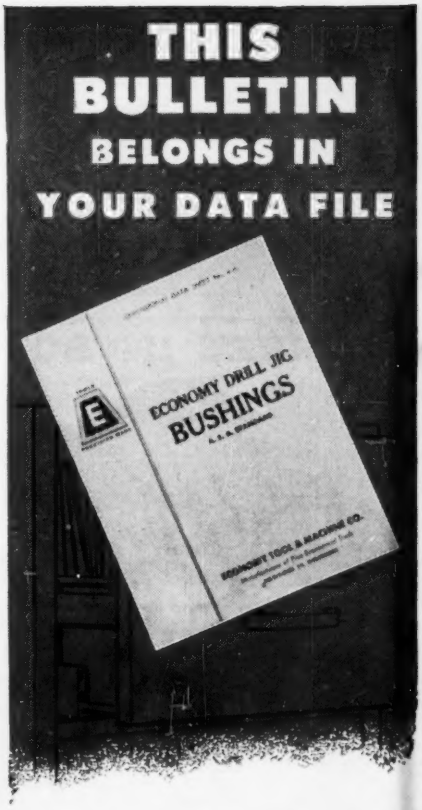


special engineering and costly manufacture are avoided as are delays usually required for conventional piping layout.

The Model 90N50 has a capacity of 10,050 c. f. m., developed by a 15 h.p. motor driving a paddle wheel fan, yet is available on an 'Off-the-Shelf" basis. A static suction of 4" on a 15" inlet is observed on instrument test.

The motor is available for operation on 220 or 440 volt, 3 phase, 60 cycle power, but motors for operation on other power supply can be supplied.

The unit is recommended for almost any type of industrial dusts such as from buffing, polishing, woodworking, chemicals, etc. Dusts from conveying, mixing, handling or boxing of the latter are also recognized uses.

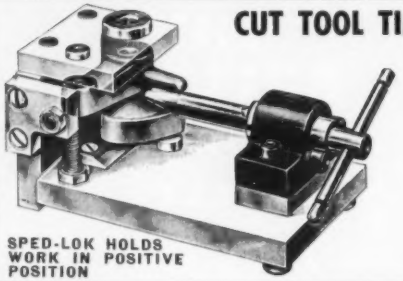


• It gives you price and specification data on *Economy* Drill-Jig Bushings — all A. S. A. standard types and sizes for immediate delivery. Write for your copy today.

Also quickly available:
new gages and gages salvaged by hard chromium plating.

Economy
TOOL & MACHINE CO.

1829 S. 68th St., Milwaukee 14, Wis.



SPED-LOK HOLDS WORK IN POSITIVE POSITION

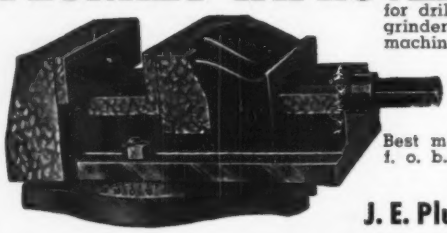
CUT TOOL TIME — PRODUCTION COSTS WITH
Sped-Lok

- **Makes it possible to build** jigs and fixtures in skeleton form thus permitting chips to be more easily removed.
- **Cam, on end of cam sleeve,** automatically compensates for variation in size of work.
- **Cam sleeve adjustment screws** allow precision setting after mounting.

CHARLES GREEN CO.
1324 ROSCOE ST., CHICAGO 13, ILL.

PLUNKET IMPROVED VISES

We make a complete line of modern vises for drill presses, shapers, milling machines and grinders. Illustration shows our standard milling machine vise as regularly furnished and stocked.



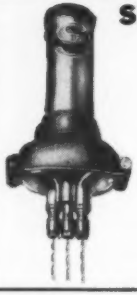
In ordering this vise give size of slot in table:
No. 10—6" jaws, 1¼" deep, opens 5"
wt. 45 lbs. $68.20
No. 20—10" jaws, 2¼" deep, opens 8½"
wt. 120 lbs. $92.40

Best material and workmanship. Prices are net f. o. b. Chicago. *Dealer's inquiries are solicited.*

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J. E. Plunket Machine Co., 1823 W. LAKE ST. CHICAGO 12, ILL.

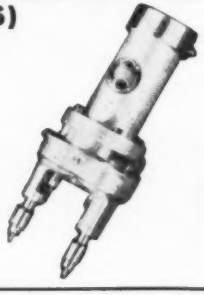
SELLEW (Standard DRILL HEADS)



will greatly increase your drilling output

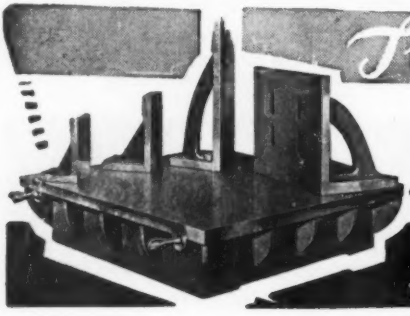
In stock for immediate delivery.

No. AAD min. .65" max. 3.4" —⅛" drill
No. 0D min. .9" max. 4.6" —¼" drill
No. 1D min. 1.16" max. 6.33"—No. 1 M.T.
No. 2D min. 1.4" max. 7.8" —No. 2 M.T.
(All above are 2 or 3 spin. min. adjustment.)
No. 3D max. 13" —No. 3 M.T.



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PAWTUCKET, R.I.



Try MILWAUKEE EQUIPMENT FOR TESTING AND CHECKING

Over twenty years of experience gives you "proved" performance — added assurance of quality production. Milwaukee Surface Plates, Angles, Parallels and Straight Edges are all made of the highest quality semi-steel and finished to exact dimensions.

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Engineers and Machinists Since 1907
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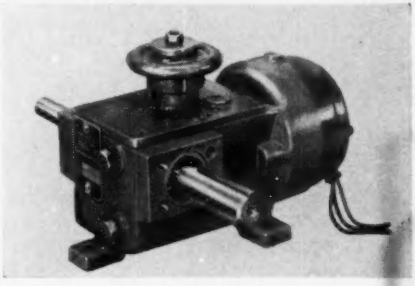
Janette Low-Speed Gear Motor

Janette Manufacturing Co., 556 W. Monroe St., Chicago, Ill., has announced the addition of the "BO" type gear-motor to its speed reduction line. Developed especially for application to combustion control systems, the BO gear-motor uses double reduction worm gearing to furnish an output speed of .4006 r.p.m. and approximately 220 pound inches output torque. Speed reduction ratio is 4242.4 to 1.

The Model BO is driven by a special single-phase, 60 cycle, 115 volt, 1725 r.p.m. capacitor-run, capacitor-start motor, furnished with three leads, and is instantly reversible up to 20 times per minute.

A double output shaft is provided with this unit, at right angles to the input shaft. One side of this double shaft is provided for driving a limit switch. The BO is also equipped with a 2½" handwheel to operate a clutch for disconnecting the motor and the first reduction worm gear. The output shaft can thus be turned by the handwheel to permit adjustments of the driven apparatus.

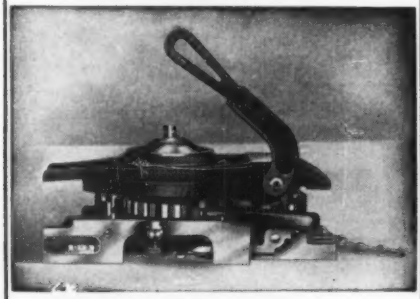
Weighing about 12 piunds, the BO measures 8⅝" in length, 9-3/16" in width, and stands 5-11/32" high with its foot



mounting base. Designed for strength and compactness, the BO gear-motor also offers space economy through right-angle mounting to the driven machine.



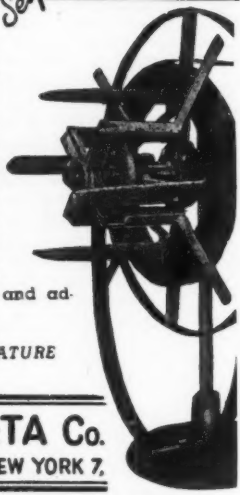
AUTOMATIC CHUCKING AND INDEXING FIXTURE



1.—1800 light cuts per hour.
2.—Either horizontal or vertical position.
3.—Collets changed instantly.
4.—Automatically knocks piece out.
Model D—Ratchet indexing only—1" cap.
Model E—Both degree and ratchet indexing —Capacity up to 1".
Model F—Both degree and ratchet indexing —Capacity up to 2¼".
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J. W. DEARBORN • Ansonia, Conn.

WESTLEN *Adjustable Self Centering* REELS



For feeding strip and wire coil stock to presses. Coil capacity 300 to 500 lbs. Outside ring dia., 28" to 36". Height of reel, 36". Wheel automatically adjusts parts to suit inside diameter of coils from 11" to 20". Arm allows for quick conversion to horizontal or vertical position and adjusts height of reel.

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The RULETA Co.
27 WARREN ST. NEW YORK 7.

NIELSEN Heavy Duty *Live Centers*

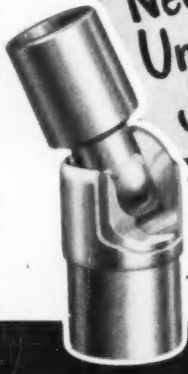
Write for catalog on live centers



Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

NIELSEN, INC. LAWTON, MICH.

New Universal Joint!



"...The Ball & Socket Joint with the Toggle Action"

Write For Folder!

B. M. ROOT CO.
YORK, PENNA.

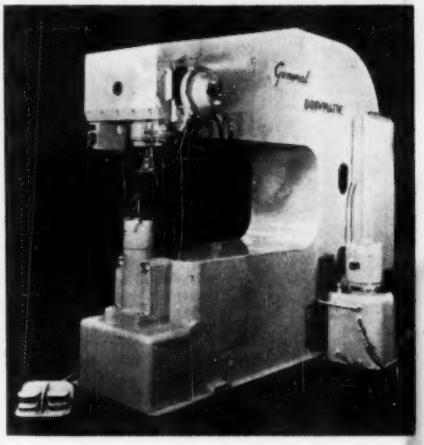
Redesigned Drivmatic Drill Riveter

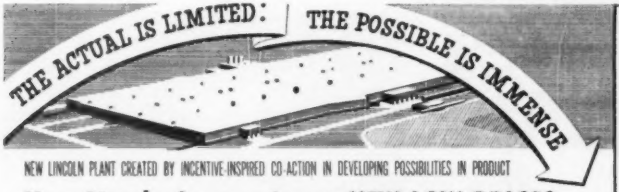
General Riveters, Inc., 785 Hertel Ave., Buffalo 7, N. Y., announce their new model G 39A Drill Riveter, an advanced design of the model G 39A Drivmatic which was developed during World War II to increase production in aircraft plants.

The Drivmatic machine drills, countersinks, feeds and heads a rivet. Positioning the work, depressing the foot switch and all four steps are performed in a continuous automatic cycle. The simplicity and the ease of operation is said to be outstanding. Drill-out of unsatisfactory rivets is reduced to a minimum, while mutilation of work pieces is claimed to be eliminated. The machine is unrivaled in speed and quality of work on both flat and contoured parts.

The work pieces are clamped securely during the entire cycle of the machine, producing accurate holes without burrs between the work pieces. Countersinking is accurately controlled and meets or exceeds present aircraft standards, according to the manufacturers.

The redesigned machine permits a maximum drill depth of 1⅜". When the unit is operated automatically, a rivet of 1⅛" maximum length can be fed. Longer lengths may be hand-fed with a specially designed hopper. The machine has a maximum force of 16,000 pounds, sufficient to head 5/16" diameter solid aluminum alloy rivets. Production speed on average work is 15 fastenments per minute.





NEW LINCOLN PLANT CREATED BY INCENTIVE-INSPIRED CO-ACTION IN DEVELOPING POSSIBILITIES IN PRODUCT

New Lincoln Accessories at NEW LOW PRICES

Insulated Electrode Holders

Unique "lock-jaw" construction on the LJ-1 gives extra strong grip, yet easy thumb release. Compact for welding in close quarters. Rated 250 amps . . . handles 1/16" to 5/16" electrodes.

"INS" Holder. Light in weight, ruggedly built, self-ventilated. Rated 250 amps. for electrode sizes 1/16" to 1/4".

Lincoln insulated holders sell for less than often charged for replacement parts on other makes of holders.

High Flexibility Welding Cable

"Lincolnductor". Lincoln's new, **low-priced,** high quality welding cable. Copper strands encased in special paper wrapping allow strands to slip within the cable when bent sharply. **"Stable-Arc".** The industry's top standard of quality. Unsurpassed for long wear . . . for resistance to impact.

High Quality Welding Lenses

"Hi-Visibility". Lincoln's new, high quality, low-priced welding lens. Surpasses Federal specifications.



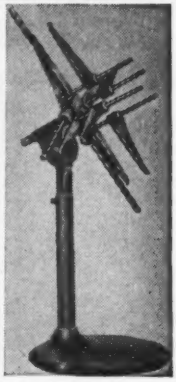
GET THE FACTS

Write for Bulletin 467, Lincoln Directory of Welding Supplies,

THE LINCOLN ELECTRIC COMPANY

Dept. 265, Cleveland 1, Ohio

Sales Offices and Field Service Shops in all Principal Cities



Universal Stock Reel

The Humm Universal Stock Reel is an essential device for the handling and feeding of coil stock to Power Presses.

1. Adjustable Reel to fit various sizes of coil.
2. Reel is adjustable to suit height of Press.
3. Reel can be inclined to any position.

Stock Reel with plain bearing $55.00
Stock Reel with roller bearing $65.00

Manufactured By

John Humm Safety Equipment Co.
253 SHEFFIELD AVE., BROOKLYN 7, N. Y.



CC Clark
ADJUSTABLE
TOOL HOLDER

Vise-grip jaw runs full length of cutter channel, firmly and safely holds tool bits of all shapes, sizes and materials

Specifications

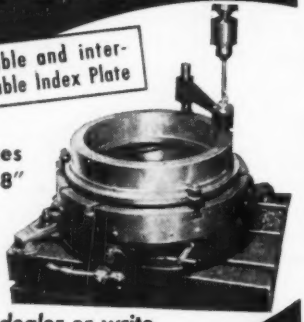
Model	Size	Tool Capacity
60	0	1/8 to 5/16
61	1	3/16 to 3/8
62	2	1/4 to 1/2
64	4	5/16 to 5/8

With 15° or parallel cutter channel, left or right hand

ROBERT H. CLARK COMPANY
Beverly Hills, California
Manufacturers of Precision Cutting Tools

Eliminate Costly Jigs with a TROYKE
BALL BEARING INDEXING TABLE

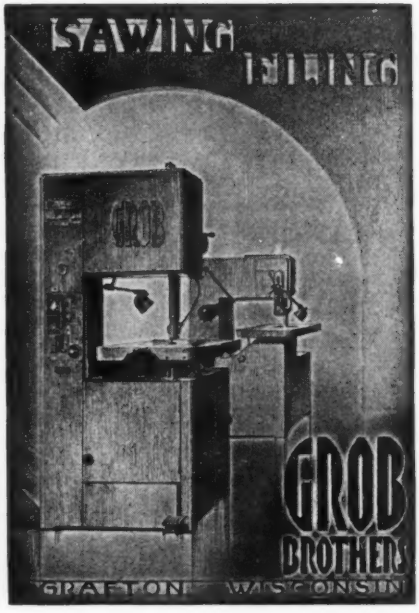
Removable and interchangeable Index Plate



Three Sizes
12"-15"-18"

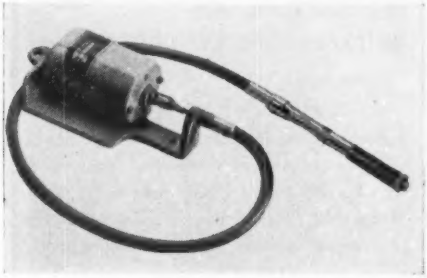
See your dealer or write for Catalog No. 14

Troyke Mfg. Co. Inc.
Cincinnati 9, Ohio, U.S.A.



Foredom Flexible Shaft Machines

Foredom Electric Co., 27 Park Place, New York, announces its new 900 Series Flexible Shaft Machines said to feature exceptional versatility. They can be employed in three ways, suspended (thus taking up no bench space), on the bench or mounted under the bench. The machines can be set virtually anywhere to suit the requirements of the job at hand.



The manufacturer claims extra good flexing qualities of the flexible shaft unit which runs in a metal casing reinforced with tough, oil-resistant Neoprene.

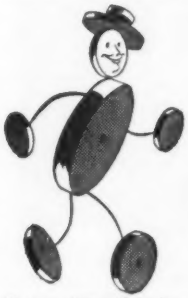
A choice of five handpiece types is afforded, pencil-size or larger, all with a quick-detachable feature, permitting the use of different types on the same machine. The manufacturer points out that the pencil-size handpieces permit keeping work in view for accurate control of the job at hand. The motors are high-speed, with a forced-draft air-cooled feature, rated 1/15 h.p., providing adequate power for every "small-work" grinding and finishing task. Illustrated catalog MTBB, showing other Foredom models is available on request.

New Putnam End Mills

Eleven new stock end mills types have been announced by Putnam Tool Co., 2981 Charlevoix Ave., Detroit 7, Mich. This expansion of the Putnam line makes a total of over 1000 types and sizes available for immediate delivery.

Included among the new end mills is a short fluted series, available in two and four flutes, single and double end designs, and in sizes up to ¼". This new design is said to have greater rigidity and be less subject to breakage than other end mills of similar size. It can be used at faster feeds than other types.

Both the short fluted series and the other new end mill types were added to the stock list because of their increased demand and growing usage.



Cut grinding costs . . . with rugged QUEEN CITY Grinders



Queen City Grinders are built to stand up under the heavy work that pours through the shop daily. Noted for their durability, freedom from downtime and low cost, Queen City Grinders cut grinding costs to the bone. • Order today a battery of these low cost grinders and eliminate "ganging up" around one lone grinder.

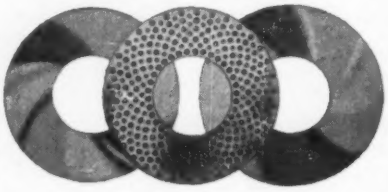
QUEEN CITY
Machine Tool Co.
235 E. 2nd St.
Cincinnati 2, Ohio

QUEEN CITY MACHINE TOOL CO

FLAT OR GROOVED RACE BALL

THRUST BEARINGS

WITH BRONZE RETAINERS



We can make them up to 25" outside diameter. We are geared to handle all of your thrust bearing needs.

Send us your blueprints

Makers of all types of dependable thrust bearings for over 30 years.

ACORN BEARING CO.

68 STANLEY ST. NEW BRITAIN, CONN.



Produce your small precision parts with well-known "DERBYSHIRE" accuracy

Illustrated:

The DERBYSHIRE ELECT lathe with 18" bed; ball-bearing headstock with collet closer attachment; double compound rack-and-pinion slide rest with front tool post slide graduated to swivel 360°; six-position turret to take standard tools.

Write for Catalog

F. W. DERBYSHIRE, INC.

WALTHAM 54, MASS. 157 HIGH ST.

STERLING DRILL GRINDER



CAPACITY:
3/8" to 2½" drills.
5" x 9" adjustable table.

MOTOR: ½ hp, 3450 rpm.

NET WT: 250 lbs.

CRATED: 320 lbs.

McDONOUGH MANUFACTURING CO.

EAU CLAIRE, WISCONSIN, U. S. A.

LOCKJAW



Set-ups stay put when Lockjaw grips with both downwards and sideways pressure . . . grip is sure, powerful, self-locking . . . eliminates cumbersome bolting and clamping . . . saves time and work spoilage. Use Lockjaw on planers, radial drills, shapers, milling machines, surface grinders, boring mills and lathes.

Two sizes: Model B for large tables. Lighter Model A where table space is limited. Interchangeable jaws to fit work contours.

Write today for Bulletin 140-A.

RIVETT LATHE & GRINDER, Inc.

Brighton 35, Boston, Mass.

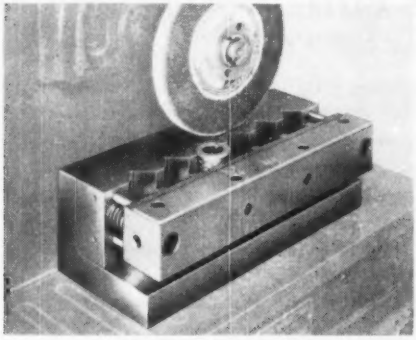
Dept. MBBA 11

For More Precision Work

RELY ON RIVETT, The Master Craftsman's Master Tools

Gang Vises for Small Parts Grinding

Two new, improved gang vises for precision grinding of small parts are introduced by Dery Tool & Die Company, Pine Meadow, Conn. Available in three and six position (illustrated) models, the new vises handle intricate grinding jobs and speed up operations, according to



the manufacturer. Both models incorporate patented Equalizing blades which automatically compensate for differences in work tolerances and eliminate ""toeing in" of undersize parts.

The three position model is designed, primarily, for use with a magnetic chuck but may be had with modifications for clamping to conventional chucks. The vise holds work in a central position, thus making it possible to invert the fixture for grinding opposite sides without additional adjustments. Standard capacity for the three-position model is ¾" x 1½". V-block vise face is provided to meet users' specifications.

The six position gang vise is designed for use on magnetic or non-magnetic chucks. It has a standard capacity for parts ranging from ⅛" to 1" and features a vise face which holds parts against a smooth, lapped surface for greater accuracy in the grinding of precision parts. Central positioning of the work makes fixture "flopping" possible without adjustment. Width of the fixture may be specified to accommodate parts requiring grinding of both ends. By using extension legs or studs, the vise may be used for double end grinding without removing or relocating the work. The patented Equalizing blades, available in shapes cut to fit work specifications are supplemented by adjustment screws which maintain parallel jaw openings.

Dependable MEASURING & CHECKING EQUIPMENT

and Now

HAND WHEELS, KNOBS, HANDLES

Cadmium Plated READY TO DELIVER

Non-rusting — good looking

STRAIGHT and OFFSET TYPE

SOLID ROTARY MACHINE HANDLES

CAST IRON MALLEABLE IRON

We also build jigs, fixtures, special tools and machinery. Send us your blueprints.

UNIVERSAL ANGLES
In 10 sizes, ranging from 4 x 3¾ x 5 and up.

BOX PARALLELS
In 15 sizes, ranging from 3 x 4 x 12 and up.

SLOTTED ANGLES
In 19 sizes, ranging from 4 x 9 x 5 and up.

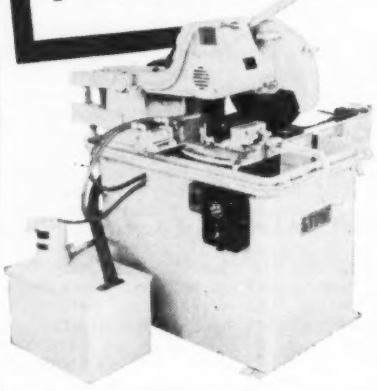
SURFACE PLATES
Over 50 sizes, ranging from 7 x 7½ to 96 x 192.

Send for Complete Catalog

MACHINE PRODUCTS CORPORATION
6771 E. McNICHOLS ROAD • DETROIT 12, MICHIGAN

Typical Cutting Times

3" angle iron — 8 seconds
2" rd cold rolled — 14 seconds
1" tool steel — 5 seconds
2" steel tubing — 5 seconds



CUT ALL METALS *in Seconds*

WITH **STONE "SWING-CUT"**

CUTS WET OR DRY

Metals in any size or shape up to 3" solids and 4" pipe cut with milled-like finish to tolerances of .008. Fast-acting, self-centering vise for angle cutting to 46°, air activated either hand or foot controlled. Vee-Block jaws for cutting rounds and tubing can be supplied.

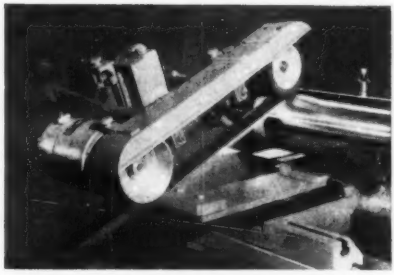
You'll want to know more about the many features of the "Swing-Cut" and how it can lower your costs. Write today and we will send you *complete* information by return mail.

STONE MACHINERY CO., INC.

401 Fayette St. Manlius, N. Y.

THREE MACHINES IN ONE . . . . . !

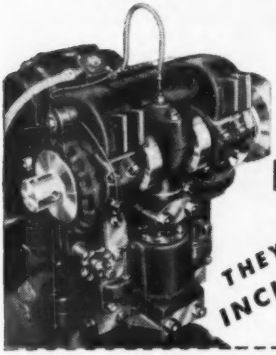
The basic unit of the Vonnegut Abrasive Belt Grinding and Polishing Machine is readily adaptable to *lathe, swing* and *floor stand* applications. The lathe application (shown) is ideal for the kind of polishing which is commonly done by hand . . . and for light cylindrical grinding in the many shops (perhaps yours) where everyday requirements for this



type of work do not justify investments in heavy duty cylindrical grinders. Eight-page bulletin showing and describing this unique, rugged, economical "little giant" in its three practical applications—*lathe, swing* and *floor stand* — is yours for the asking. Specify Bulletin No. Sixty-Two.

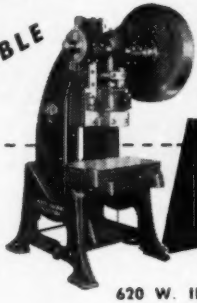
VONNEGUT
MOULDER CORPORATION
1805 MADISON AVENUE • INDIANAPOLIS 25, INDIANA

IF YOU FAVOR **RUGGED EQUIPMENT,**



JOHNSON POWER PRESSES ARE *THE* BUY!

THEY'RE INCLINABLE



Because Johnsons are built extra husky, you can do bigger jobs on smaller presses. Why not pay yourself a production bonus the Johnson way?

ALL JOHNSON MODELS from 16 to 90 ton capacity have EXTRA SAFETY FEATURES you should know about. Write for FREE CATALOG of six Inclinables now available. You'll be happier with Johnsons on the job!

Johnson

MACHINE and PRESS CORP.

620 W. INDIANA AVE. • ELKHART, IND

PRECISION BUILT MACHINIST VISE

Enclosed design prevents chips and dirt from entering internal parts. The balanced motion of a fine threaded spindle, moving freely in an ingeniously anchored sleeve type nut, eliminates dead motion and strain on moving parts. Head moves in precision broached keyway. Complete size range of bench and combination pipe vises. Before you buy, write for our descriptive catalog and give us the name of your preferred distributor.



5 YEAR GUARANTEE

WILTON TOOL MFG. CO.
925-E Wrightwood Av., Chicago 14, Ill.

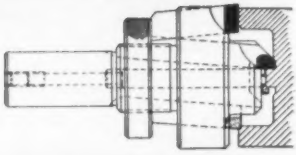
WILTON
THE FINEST NAME IN VISES



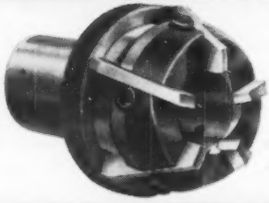
"C" CLAMPS OF PEARLITIC CASTINGS — tensile strength up to 80,000 P. S. I. — lower in price than forged clamps yet equally efficient.

GENESEE

COST CUTTING MULTIPLE OPERATION TOOLS



HOLLOW MILLS - UNDERCUTS - FACES
CHAMFERS · BORES & SPOT DRILLS



STD. 0-2" CAPACITIES H.S.S. or T.C.T. Blades 10 STYLES

ADJUSTABLE HOLLOW MILLS



STD. 1¼ to 4" DIAMETERS INTERCHANGEABLE PILOTS H.S.S. or T.C.T. BLADES

FACING AND COUNTERBORING TOOLS

Let our Engineering Dept. solve your Production Tool problems. Over 40 years of Know How at your disposal.

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GENESEE MFG. CO., INC.
ROCHESTER 4, N. Y.

- ADJUSTABLE HOLLOW MILLS
- FACING AND COUNTERBORING TOOLS
- SPECIAL PRODUCTION TOOLS



is the **ONLY** *Center with the*

OVERLOAD INDICATOR

Look for the **RED BAND**

You no longer have to guess whether you are overloading your live center thrust bearings if you use MOTOR TOOL LIVE CENTERS. When the load is too great the RED BAND around the spindle disappears into the housing. You can see at a glance when overloading occurs. This is an exclusive feature, developed by Motor Tool which cuts repair costs to practically nothing if due diligence is exercised. As long as the RED BAND is visible you are running COOL and SAFE.

Send for

N E W descriptive folder . . . and *verified* case histories of how MOTOR TOOL LIVE CENTERS have *out-performed* and *outlasted* ALL other centers on exceedingly tough, continuous-run jobs.

MOTOR TOOL MFG. CO.
P.O. BOX 3805 PARK GROVE STATION DETROIT 5 MICH.

Make it a Rule to Call Motor Tool

Copper Cleaning Shot for Brass and Bronze Finishes

A new copper cleaning shot, designed for the non-ferrous trade is announced by the Harrison Abrasive Division of Metals Disintegrating Co., Inc., Elizabeth, N. J.

The manufacturer claims that this new product solves the cleaning problem of plants which cast and finish in brass and bronze; the possibility of the sand or steel grit used in the blasting operation becoming imbedded in the work is said to be eliminated. The new Harrison L/D Copper Cleaning Shot cleans the casting by the force of its impact, yet does not imbed itself. Thus, it is possible to obtain the fine finish which results from "working" the surface of the casting without cutting it.

Harrision L/D Copper Cleaning Shot can be used either in an air or wheel type machine and for all types of non-ferrous castings and pieces. In addition to its use with brass and bronze, it is also said to be effective when used for blasting aluminum pieces, in order to obtain a uniform finish. While designed specifically for the non-ferrous casting trade, it is also applicable to all types of cleaning and finishing where a light finish is desired.

The shot is made from high grade copper wire and is in the form of cylinders with the length of each cylinder being equal to its diameter. During use, the cylinders round up to form spheres. The edges of the cylinders provide the cleaning action and round balls work the surface to yield the finish.

Resistance to wear is claimed to be remarkable. There is no dust problem caused by the breaking down of the abrasive, nor is there any problem resulting from dampness or moisture in air lines or machine. The shot can be reused for extended periods of time.

Commander Drill Chip Breaker

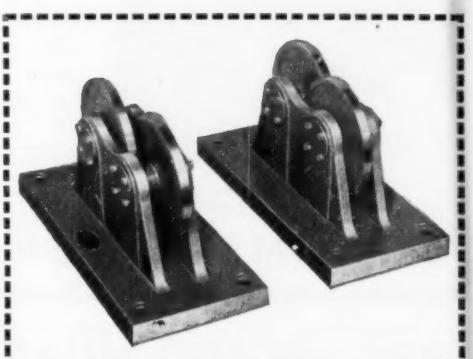
A new Drill Chip Breaker, which the manufacturer claims will increase drill production 100% or more, has recently been introduced by the Commander Manufacturing Co., 4227 West Kinzie St., Chicago 24, Ill.

According to the manufacturer, the Commander Drill Chip Breaker permits an increase of drilling speeds up to 50% or more than commonly accepted standards; it is said to produce more uniform, smoother, rounder and straighter holes

Anderson

PILLOW BLOCK
BALANCING WAYS

Especially suited for large diameter work, as a sub-base can be made of proper height to give necessary clearance for work. Anderson Pillow Block Balancing Ways are precision built with chilled iron discs which rotate with minimum friction on sensitive special bearings. Many manufacturers have endorsed them for profitable, efficient, static balancing.



ROCKFORD
Anderson
BROS. MFG. CO.
ILLINOIS

Built in 1,000, 2,000, 5,000, 10,000 and 20,000 Capacities

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ANDERSON BROS. MFG. CO., Rockford, Ill.

Balancing Ways, Roto Checkers, Hand and Power Scrapers, Spotters, Hand and Power Hydraulic Straightening Presses

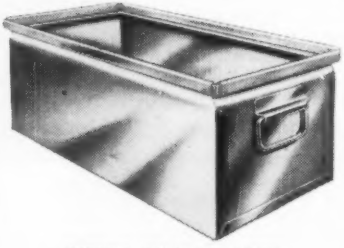
FOR REMOVING BROKEN TAPS ★
QUICKLY . . .
INEXPENSIVELY . .
★ WALTON
TAP EXTRACTORS are the TOOLS



THE WALTON COMPANY
HARTFORD 10, CONNECTICUT

I-M-M-E-D-I-A-T-E D-E-L-I-V-E-R-Y

BAY STACKING BOX



All Prices F.O.B. Factory

Reinforced Corners • Drop Handle Each End • Spotwelded Construction • Four Rivets for Extra Strength • Continuous Stacking Rim All Four Sides

Product Number	Width	Length	Height	Gauge Steel	Price Green
801D-18	10"	16"	6"	18	$2.05

PHONE: BA ldwin 9-1805
WIRE - WRITE

BAY METAL PRODUCTS 3003 N. 16th St., Phila. 32, Pa.

***Small* END MILLS**
that do a BIG JOB
MICRO MINIATURES

Precision Ground from SOLID
LONGER LIFE — FASTER CUTTING STRENGTH
WE SPECIALIZE IN SMALL SIZES
Fast Delivery on Your Special Requirements
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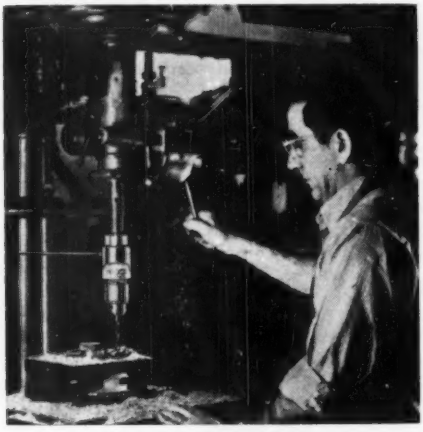
THE SECRET
of their durability and long life lies in our method of grinding which produces a smooth, unbroken cutting edge. No saw tooth edge to load-up and break-down.



Trade Mark

WOODSON TOOL CO. 4811½ LENNOX BLVD. • INGLEWOOD, CALIFORNIA

as well as to increase drill life and the number of holes between sharpenings. This improved drilling is possible, because the short chips produced by the Drill Chip Breaker give free cutting action and allow the coolant to flow down the flutes to reach the point of the drill.



Further economy and increased production are claimed for the Drill Chip Breaker in deep hole drilling, since it is no longer necessary to withdraw the drills in order to clear long chips that clog the hole, break drills and shut off the flow of coolant. Operator safety and work handling speed are increased due to the elimination of whirling, sharp spiral chips.

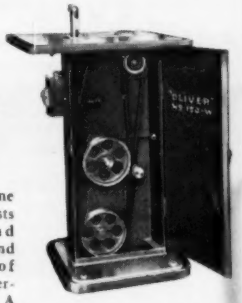
Starrett Dial Comparator

The No. 653 Dial Comparator is designed for inspection operations, and for use in tool rooms and machine shops in a wide variety of applications. Designed for general utility, it has a ribbed baseplaten, precision ground to close limits and approximately 8″ x 9″ in area which accommodates all types of work as well as various V-blocks and special fixtures. The Dial Comparator is a recent development of The L. S. Starrett Co., Athol, Mass.

The dial indicator bracket is held on the end of a ribbed, rigid bracket adjustable vertically on a substantial, ground post mounted square with the base platen surface. A large-diameter screw locks the bracket in the position desired and a sliding ring with locking screw below the bracket permits positioning the indicator to either side for measurement at

"OLIVER"
Wet Grinder & Polisher

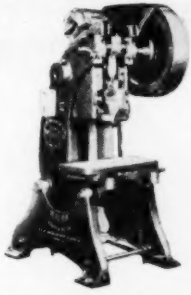
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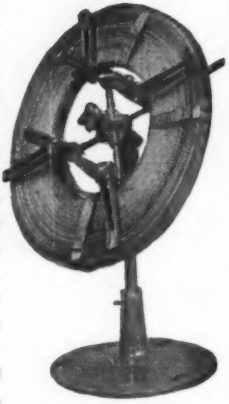
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The S and S stock reels with quick loading arms are designed for the economical handling of stock from coils. Constructed with a snap lock knuckle joint for loading. These reels may be set in any plane from vertical to horizontal. Double swivel reels are manufactured so that loading is possible while other spool is reeling out stock.

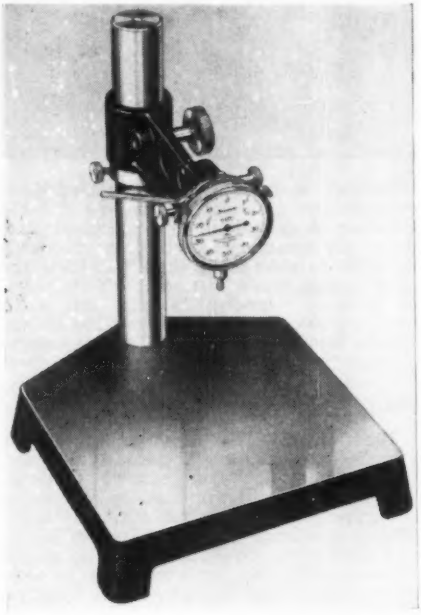


Dial And Roll Feeds For Presses

S&S MACHINE WORKS
4539 W. Lake St., Chicago, Ill.

any point relative to the base. The ring acts as a safety feature preventing accidental dropping and damage to the indicator. Final setting of the indicator can be quickly made by an adjustment provided by means of a knob-operated rack and pinion at the end of the indicator bracket.

Operation of the dial indicator is by a hand lever which is pressed down to lift the spindle and released to contact the work. Left hand operation permits easy handling of work with the right hand. (If desired, a lever can be furnished at right.) Plus or minus variations from size in .001″ can be read off instantly from the indicator and readings are uniformly accurate because of predetermined spring contact pressure entirely independent of the operator's "feel." The

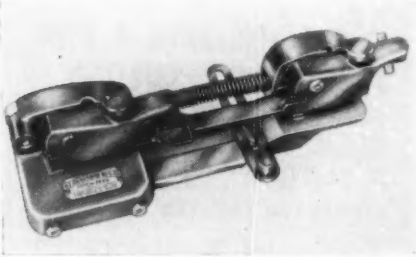


dial can be adjusted relative to zero and then locked with the bezel clamp. The indicator regularly furnished is graduated .001″, dial reading is 0-50-0, range .250″.

The maximum vertical capacity of the No. 653 Dial Comparator is 9¼″. The maximum throat depth is 5″. The base platen measures 9″ x 9⅝″. The vertical adjustment of the dial indicator is 1-5/16″.

Hitch Feed for Coil Stock

Introduction of its new 2½" advanced design Hitch Feed for feeding coiled material is announced by the H. E. Dickerman Manufacturing Co., Springfield, Mass. In this unit, a feed for handling the lighter gauges of stock from .003" to .050" in thickness is now available, with greater control of the stock. It also permits the feeding of these lighter gauge materials without the danger of buckling. The Hitch Feed is designed for ease of mounting on any press or to the dieset.



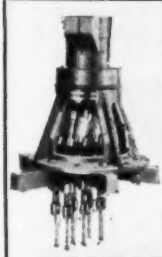
The exacting requirements are met in this new Hitch Feed for a unit which will handle the feeding of intricate multi-station progressive dies, as well as simple blanking and piercing dies.

No tools are required to make adjustments for gripping pressure or feed length, and the design automatically maintains the proper gripper plate angle. Long service has been built into this feed through the use of massive main frame and moving members and Carboloy wear and gripping plates, according to its manufacturer.

Anode Baskets Salvage Nickel Scrap

Present shortages and still greater impending shortages in nickel for plating purposes again indicate the importance of utilizing scrap wherever possible. Production can be extended, and considerable savings realized, if butts, sword ends and pieces of nickel that are normally scrapped can be used in their entirety.

Automotive Rubber Company, Inc., 8601 Epworth Blvd., Detroit 4, Mich., offer a line of insulated anode baskets for this purpose. The baskets have welded steel cores and are completely coated with semi-hard rubber. They suspend from the anode rail and new anodes are suspended inside the baskets with the scrap packed tightly around them. The baskets are designed to absorb shock and cutting.



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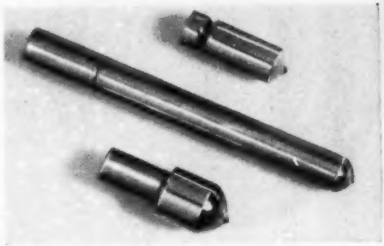
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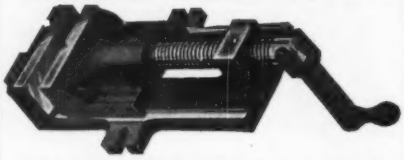
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This new Yost vise has been designed expressly for use on drill press operations. Does away with special and costly jig fixtures.

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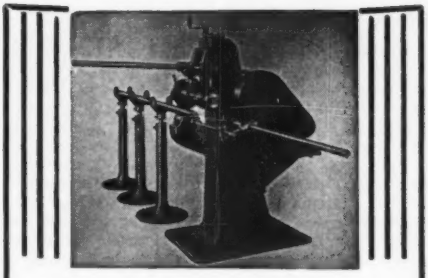
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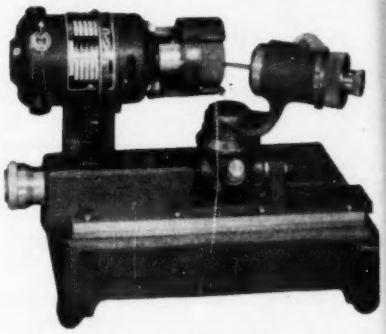
The Mico Cutter Grinder

The Mico Model 295 Cutter Grinder is an accurate grinding machine of universal application which will perform cutter-grinding operations on all types of engraving cutters, according to its manufacturer, Mico Instrument Co., 80 Trowbridge St., Cambridge, Mass.

The grinding head is furnished with an indexing unit which is equipped with a latch-type stop attachment, assuring positive positioning for the cutter surface which is to be ground. The base of the grinding head is accurately indexed from 0 to 90°, so that cutter sharpening can be accomplished to the exact degree which the blade cutting angle requires.

The carriage which mounts the grinding head is controlled by a knurled knob which is direct reading to .001" for accuracy in positioning of the cutter. The grinding wheel is 1½" in diameter; it is driven by a 7500 r.p.m. universal motor, suitable for either a.c. or d.c. at 115 volts. All castings are of cast iron, accurately machined.

The Model 295 Cutter Grinder is 10¼"



long, 7½" wide and 8" high; weight is 17¼lbs. Suitable adaptors can be furnished to increase the scope of the unit.

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MIGHTY MIDGET RADIUS DRESSER

7" Size

$41.00 with Diamond



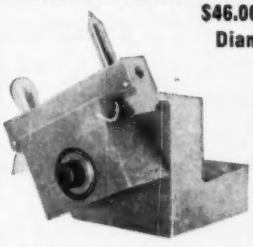
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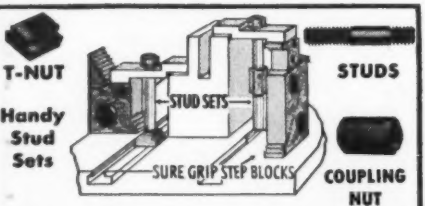
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There is a Commander MULTI-DRILL Distributor in your area. Write for his name, literature and complete details.

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4227 West Kinzie St. Chicago 24, Illinois

Product of *Commander* — Builder of the *Commander Tapper*

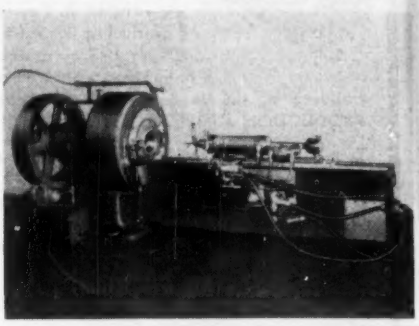
New Swager Cuts Production Time

A swaging machine which features special dies, and which successfully swages harder and tougher steels in length-to-diameter ratios beyond previously accepted standards, has been marketed by Fenn Manufacturing Co., 1841 Broad St., Hartford 1, Conn. The machine is adaptable to a wide range of uses throughout the metal-working industry.

This swager is stated to effect immense saving in material. The spindles it produces were formerly turned out on automatic lathes, turning blanks 10" in length, producing three different tapers, including the Morse taper on the shank. The spindles were then finish-ground to specified dimensions.

With the new Fenn swager, material requirements are said to be cut in half. Blanks only 4½" in length are needed, the material being lengthened by the swager as the tapering operations are performed. The finished length is 9". Three cycles are used to produce the spindle. One set of dies swages the blank from its original diameter of ½" to ⅜". This cycle is accomplished in 20 seconds, including loading, swaging and removal. A "bumping" operation follows with a second set of dies and takes 14 seconds. The final operation is the swaging of the Morse taper on the shank end, and this takes only 6 seconds.

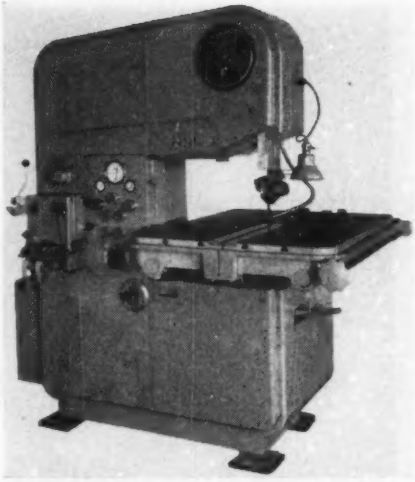
The material used is 52100 type steel having an initial hardness of 90 Rockwell B, and the swager maintains concentricity to within .004". The blanks are fed into the swager hydraulically and the dies are oil cooled. A finish grinding operation



follows swaging, but the swaged blank requires less time and material removal by grinding than does an equivalent blank turned on a lathe, according to Fenn Manufacturing Co.

DoAll Unit Cuts All Solid Materials

A new semi-automatic hydraulically controlled machine tool, the DoAll Contour-matic, is now available that will cut every solid material. It provides fast-precision cutting of these materials, which can be performed through a repetitive production cycle, easily controlled by the operator. This new machine tool, employs an endless band of teeth to slice through material, removing it in sections. This feature accounts for the speed and ease with which material is cut, while eliminating the waste of stock material which is usually reduced to chips in cutting out a shape on other machine tools. The Contour-matic was developed by the DoAll Company, Des Plaines, Illinois.



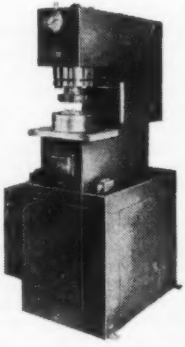
The Contour-matic is designed and engineered for efficient fast semi-automatic operation by apprentices for high production cutting. The machine has a 20" throat and 12" thickness capacity with over fifty-three features for production cutting. Each performs a function most often requested by the thousands of present industrial contour saw users. Chief of these is the dial control of hydraulic power used in operating the machine—a wide range of speed in saw band velocity—replacing manual material feeding with power feeding, provide more automatic operational controls and convenience for mounting attachments.

PRODUCTION UP 1500%

M & N SOLVES A PROBLEM

. . . Client Cuts Costs

The U. B. Company (name on request) was producing 30 buffing wheels an hour—using ordinary hydraulic equipment. Consultation with M & N engineers brought about plans and subsequent building of the M & N "C"—Frame press illustrated. HOURLY PRODUCTION JUMPED TO 450 UNITS!



M & N Hydraulic Presses are available from 5 to 75 ton capacity, compactly built and self-contained. Press may be operated manually, by foot, or push button. Double acting cylinder provides power ram return at high speed. This M & N "C"—Frame press features automatic reversal of pressure setting.

M & N Presses are successfully used for drawing, forming, powder metallurgy, silversmithing, punching, stamping, and a wide range of other industrial uses.

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M & N MACHINE TOOL WORKS, INC.

299 ALLWOOD ROAD CLIFTON, N. J.

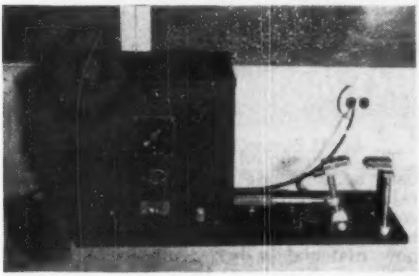
Most of these functions are handled in the Contour-matic through hydraulic power with push-button or dial control by the operator. All controls are mounted on the front of the machine convenient to the operator.

The DoAll Contour-matic has an infinitely variable and stepless speed range from 40 to 10,000 f.p.m. This range is stated to be sufficient to provide correct velocities for contour or friction cutting of every material. Variable hydraulic feeding pressure up to 100 pounds is provided. Computation of correct blade velocity, feeding pressure and type of blade to be used in cutting materials is shown on a "job selector" dial mounted on the upper door of the unit. An operator merely dials the material to be cut and immediately is provided with correct cutting information. Saw bands are mounted on the saw carrier wheels, as the upper saw wheel is hydraulically lowered and raised. This hydraulic control also maintains automatically correct saw band tension throughout the life of the band. A specific operating velocity is obtained through a hydraulic—controlled three-speed transmission and the "Speedmaster," a variable speed pulley device.

In feeding material into the saw band, pressure and speed of table travel is controlled by the operator through another hydraulic control valve and pressure dial indicator that governs the hydraulic reciprocal movement of the work table through a full 16″ stroke.

Luma Production Soldering Tool

Luma Electric Equipment Company, P.O. Box 132, Toledo 1, Ohio, announces the development of a new solenoid-operated resistance type soldering tool which is flexible in operation and can



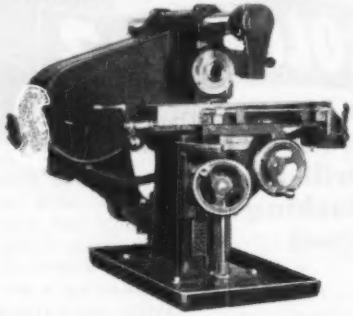
be used for various types of soft soldering and silver braze operations. It is said to be especially adapted for sweat-





BURKE No. 4 Universal

A versatile, precision small Milling Machine at a very low price.



Power or hand feed. Use on bench or pedestal.

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The Burke Machine Tool Co.

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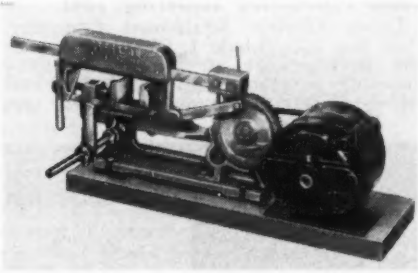
The soldering electrodes are solenoid-operated, controlled by a foot switch allowing the operator complete freedom of the hands to position the work and apply solder. The unit illustrated is a 2500-watt capacity tool equipped with a selector switch that gives instant temperature control at six different settings to suit the job at hand. It can be furnished with one, six or ten stages of heat control.

The device provides uniform work, as all units are equipped with a time clock giving positive control of the time cycle per connection. Soldering contacts are graphite blocks which can easily be shaped to fit the application.

This type of tool is claimed to offer definite savings in time because it requires no preheating period. A flip of the primary switch, and the tool is ready for instant use. Work capacity is very high as the soldering operation is practically 100% mechanical in operation. Another feature is the low operating cost; operating current is used only during actual operation.

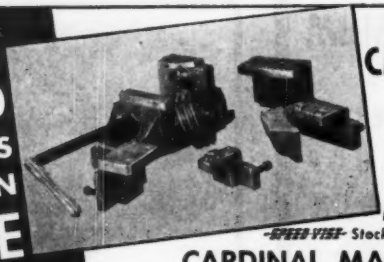
High Capacity Power Hack Saw

Sales Service Machine Tool Co., 2363 University Ave., St. Paul 4, Minn., announces that their portable Jefferson "601" Power Hack Saw has been redesigned to cut material accurately up to 3½"x3½" and permit angle cutting of 2⅝" material up to 45°. Full cutting stroke is now 3½".



The re-designed Power Hack Saw now uses a 10" blade as standard. Pressure relief on return stroke reduces unnecessary blade wear and a special latch bar holds frame in hoisted position when new material is being placed in sawing position. Standard equipment also includes a gauge bar that permits cutting of uniform length pieces. The Jefferson "601" Power Hack Saw comes equipped with a ¼ h.p. electric motor.

A HUNDRED JIGS IN ONE



CARDINAL -SPEED VISE-

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1. Saves time — one hand operation — "lift, slide, lock!" 2. Saves tooling expense — smaller, simpler jigs. 3. Saves space in tool crib. 4. Indispensable for toolroom work in addition to production.

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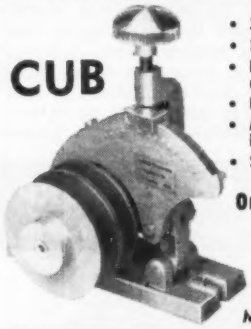
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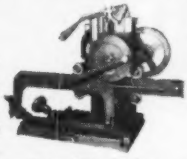
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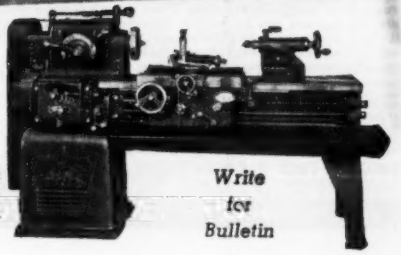
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12 Speed Geared Head Motor Drive Timken Mounted Spindle.

Modern Design — Liberal Dimensions.



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AND

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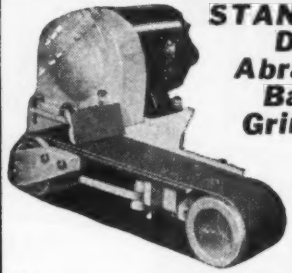
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STANDARD D-4 Abrasive Band Grinder



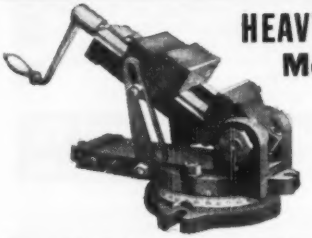
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This new, streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood, fibre . . . at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood 4x36¼" band. The ideal portable unit.

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Jaws are hardened and ground. Special outstanding features are the size and opening of jaws—4" Jaws open full 4", the 6" Jaws open full 6" etc., with corresponding depth of Jaws. Vise can be used as ordinary vise when lowered to horizontal position. Swivel bases furnished if desired. Sizes 4", 6" and 8" Jaws and openings. Prompt deliveries.

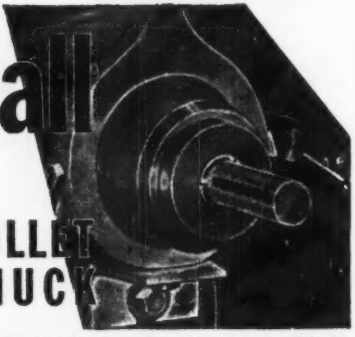
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Deep Throat Bench Punch

The new Whitney-Jensen No. 18 Bench Punch has a higher and deeper throat than is common with most hand-operated bench punches in its capacity range, according to its manufacturer. The throat depth is 7″ and the throat height is 5″. It is made by Whitney Metal Tool Co., 115 Forbes St., Rockford, Ill.



The high, deep throat is desirable for a variety of punching applications, including the ability to punch holes close to the web of an angle. The value of the punch is further increased because the die shoe is both removable and adjustable, thereby permitting the use of close fitting punches and dies.

The Whitney-Jensen No. 18 Bench Punch is a roller bearing, lever-type punch made of durable forgings and steel plate. A convenient work table, 10″x10″ with ¼-20 tapped holes for locating side and back gauge bars, is available. The maximum capacity of the tool is a 13/16″ round hole through 12-gauge mild steel. Standard Whitney-Jensen punches and dies, in a wide range of sizes, can be used on this punch. Irregular shaped punches and dies are also available from the manufacturer.

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In This Case, It's Not a Storage Bin . . .

THE D. P. S. HOPPER UNIT

is a SELECTIVE FEEDING DEVICE whereby production parts are selected, oriented and fed in a given position for primary and secondary operations.

It is the result of years of experience in solving feeding and assembling problems, speeding production, reducing costs and eliminating the manual handling of parts. D.P.S. Hopper Units are widely adaptable to Presses, Centerless Grinders, Thread Rolling and Slotting Machines and special machines. They do a precision job of feeding screws, screw blanks, rivets, pins, nuts, discs, washers, steel balls, etc. Sizes 8", 10", 12", 16", 24" and 30" diameters. Let D.P.S. Hoppers prove their indispensability in your plant.



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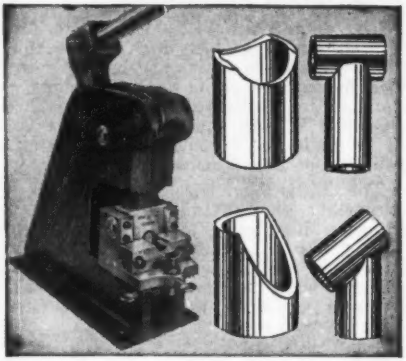
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NOTCHING TUBING OR PIPE ENDS EASILY WITH

ARC·FIT

Patent No. 2,126,519

IN POWER PRESS OR HAND PRESS



Arc-Fit is a notching unit for preparing pipe or tubing ends in making welded or brazed tubular joints. Arc-Fit will prepare the ends of a pipe or tube in less than 5 *seconds*. Arc-Fit is a production tool that will cut your production costs. It is applicable in any industry where pipe or tubular construction is used.

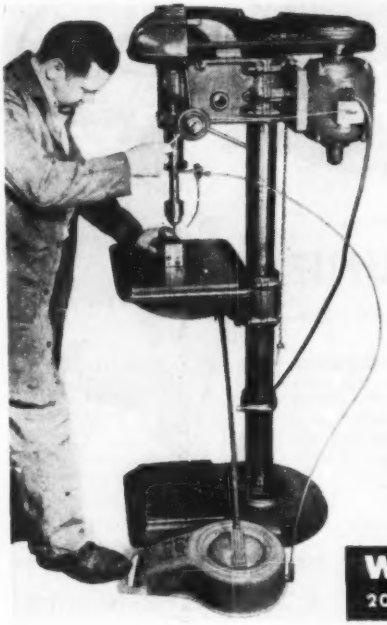
- Arc-Fit can be utilized in any power press.
- Arc-Fit can be furnished for any size tubing or pipe.
- A hand press can be supplied with Arc-Fit units for shearing pipe or tubing sizes 2 inches or under.
- For sizes over 2", angular cuts other than 90°, and slotting operations. Quotation furnished on request.
- Arc-Fit does not deform pipe or tube. No grinding or finishing operation is needed.
- Engineers can now design for tubular construction and cut costs.

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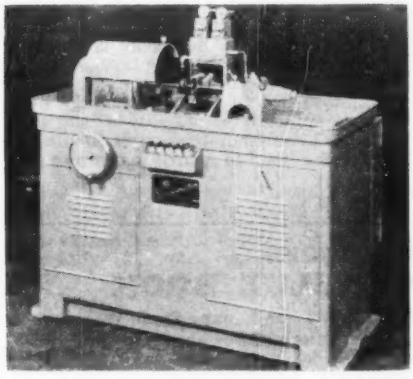
2001 James Ave. N. • Minneapolis 11, Minn.

Correction, please

The editors are sorry that in their anxiety to do a good job on last month's Honing, Lapping and Superfinishing report the illustrations showing the Gisholt and Ohio Units Superfinishers were transposed. Herewith, and with an apologetic, "It's human to err", we publish the illustrations as they should have appeared last month.

Gisholt Superfinishers

Illustrated is Model 51 A with a special stoneholder assembly mounted on the bed, made by the Gisholt Machine Co., Madison, Wis. This machine is designed for a wide range of miscellaneous or production work. Length of



traverse is adjustable at either end of the stroke. Positive stops have both coarse and fine adjustment.

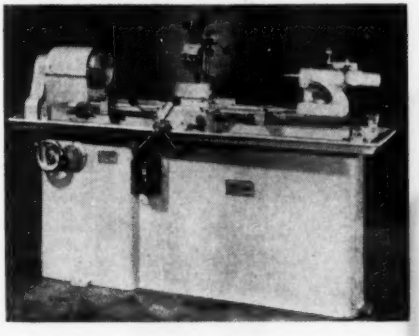
Spindle is driven by multiple vee belts. Spindle bore has a No. 5 Morse taper.

Centerless roll drive attachment, which is available, consists of two fibre rolls on which work is driven. Rolls are rotated by sprocket and chain actuated by pinion in the spindle nose. Attachment for flat surfaces can also be furnished. This is mounted in place of the regular head. Vertical shaft carries a cupped wheel abrasive.

Also made by Gisholt is a No. 4 Heavy Duty Superfinish Attachment for mounting on engine lathes and is designed for use on large cylindrical surfaces, but may be used for flat work.

Lambert Model 325 Superfinisher

This machine, made by Ohio Units, Dayton, Ohio, is capable of superfinishing tiny precision aircraft instrument parts to large paper rolls. Surfaces of



all shapes: round, internal or external, flat, concave, convex, eccentric and taper, may be handled on this machine.

Headstock spindle is mounted in Timken roller bearings. Spindle is threaded at the front end to receive face plate, chuck, adapter or other special fixture. Spindle bored for No. 4 Morse taper.

The internal superfinishing head is attached to the cross slide on the carriage. It is swivel-mounted on a plate, calibrated in degrees so that it may be set at angle desired. Multiple superfinishing heads can be assembled for finishing a number of different bearing surfaces, i.e. crankshaft bearing surfaces. The head assemblies are mounted on individual carriages.

---

60. Precision Grinders with variable table speed can grind various metals and materials of different hardnesses. Power feed model 2B, also shown and described in a 4-page circular, is made of heavy stressproof construction to eliminate vibration. Specifications and other pertinent data of these grinders are covered in this circular available upon request to **Reid Bros. Co., Inc., Beverly, Mass.**

Hammond Cyclone Type Duskolectors

Hammond Machinery Builders, 1614 Douglas Ave., Kalamazoo, Mich., announce two new models to their line of Cyclone Type Duskolectors. Model CYO-6, shown below, is recommended for installations for exhausting air to the outside. Model CBY-6, not shown, is of the same construction but is fitted with a dust proof bag, and is adaptable where conditions permit recirculating the air. Their larger dust capacity, and 2 h.p. motor provide a heavier duty dust collecting system for dust, grit, lint, saw dust, plastics, buffing compounds, etc.



The capacity of both models is 1150 c.f.m., velocity 5600 f.p.m., with a 2 h.p. motor. The base is 26" in diameter and the dust pan capacity is 10,620 cu. inches. Overall height is 86", inlet size is 6" and the outlet size is 7".

Face Shields Offer High Protection

Fendall Company, 4631 N. Western Ave., Chicago 25, Ill., manufacturers of head and eye protection equipment, has introduced a new line of face shields available with two different types of headgear. One type of headgear is equipped with an overhead brow guard or spark-deflector. The other has open top for ventilation on hot jobs. The entire headgear is said to be sturdily constructed, with the headbands formed to fit the contour of the head to insure maximum comfort.

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For internal grinding that will outlast and out-perform any diamond wheel you have ever used. After many years of research by the **ACE ABRASIVE LABORATORIES,** manufacturers of the famous **STAR DUST,** laboratory graded diamond powders and diamond lapping compound, a diamond wheel has been developed by us in a new bond containing **STAR DUST,** uniformly graded diamond powders. This combination assures you of unequalled performance in both cutting ability and wheel life. Even available in unusually small sizes, such as .046 — .090, etc. up to 2″ diameter. **PRICED RIGHT!** For further information write or call.

ACE STAR DUST **ABRASIVE LABORATORIES**

250 W. 57th St., New York, New York

Two-Speed All-Angle Head Drill

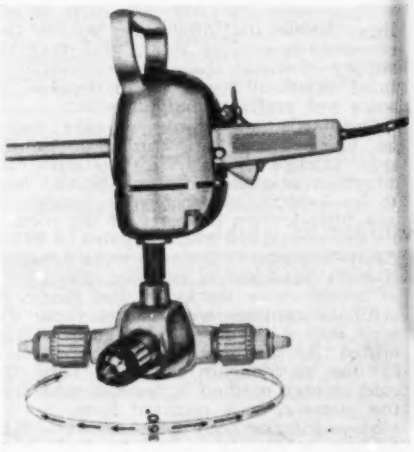
A versatile and practical tool for everyday use by electricians, maintenance crews, etc., is the new 2-speed All-Angle Head Drill developed by Cummins Portable Tools., Division of Cummins Business Machines Corp., 4740 Ravenswood Ave., Chicago 40, Ill. With its low speed of 275 r.p.m. for deep boring, high speed of 1100 r.p.m. for small holes and drilling lumber, the tool has a wide range of usefulness and speeds up work tremendously.

The All-Angle Head feature is especially useful for getting into "tight spots", often inaccessible with an ordinary drill. The head rotates through the full 360°; when it is set at a right angle, the tool measures only 7½″ overall width. Joists set on 12-inch centers can be drilled with ease at any angle.

Capacities of the drill range from ½″ in steel up to 4″ in soft woods.

The angle head is easily removable from the spindle; and when the Jacobs chuck is then removed from the angle head and screwed on to the spindle shaft of the drill, the tool is converted into a standard duty ½-inch drill.

The drill unit is the Cummins Model 200, ½-inch Drill. The 360° 2-speed Angle Head Attachment is strongly built and designed to fit comfortably into the operator's hand with maximum control of the head in any drilling position. Its net



weight is only 2 pounds. It will fit any make of ½-inch electric drill having a ½-20 threaded spindle.

Commercial Use Sought for Gallium

Wanted: commercial uses for a costly, little-known metal which will melt when held in the hand, and has other unusual properties of so far undetermined utility.

Briefly stated, that is the problem of a group of scientists at The Eagle-Picher Co. laboratories in Cincinnati. They produce a unique metal in considerable quantity but as yet have learned of no major use for it.

The metal is gallium, a by-product of the extraction of lead and zinc in the tri-state area of Missouri, Kansas and Oklahoma.

At present a price of $1,300 a pound is quoted on the silvery, material by The Eagle-Picher Co. Small quantities have been sent to laboratories over the country doing various types of research.

So far the most important work on potential uses is being done by the U.S. Navy in experiments at Bethesda, Md. A radioactive isotopic form of one of the gallium salts has been injected into test animals and autoradiographs made of the animals' bones.

These show that the material has the ability of going direct to the growth areas within the bones and concentrating there. Since gallium, in this form, has a relatively short radioactive life, there are indications that it may prove valuable in diagnosis and possible treatment of cancer of the bone. Work done so far is still in the preliminary stages.

Those who are producing metallic gallium believe that other uses will be discovered, sooner or later, and that the supply of metal that has been accumulated eventually will be in demand for some yet undiscovered purpose.

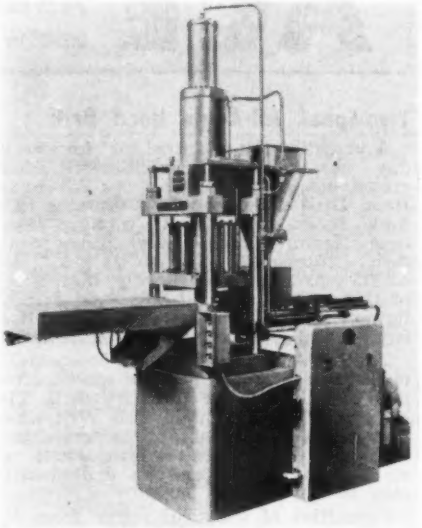
Ordinarily one thinks of rare metals as being stored in vaults or similar safe storage spots. With gallium, the situation is quite different. Stocks have to be kept in a refrigerator because of one little-known property of the metal—its extremely low melting point of 85° F. As it is prepared for sale to laboratories it is in the form of metallic crystals of a distinctive, thickened leaf shape, At ordinary summer temperature these will melt into a silvery liquid if not refrigerated. As the temperature drops below 85° the metal again solidifies. Thus, the cold storage method is necessary to keep the material in a constant form.

Since interior body temperature is 98.6° gallium is readily melted by body heat. When a piece of it is held in the clenched hand there is a distinctly cold sensation as the material is warmed and begins to liquefy. Soon one edge gives way, just as a silver coin would under more intense heat, and the metal flows out between the fingers.

For a time it was thought that another property of gallium, its high boiling point of 3500 degrees, might lead to its use as a heat transfer agent in atomic power piles. However, this possibility later was discounted because of the relatively small amount of the metal in existence, and the large quantities of material that would be required for extensive atomic power development.

Stokes Dual Purpose Molding Press

F. J. Stokes Machine Company, 5900 Tabor Road, Philadelphia 20, Pa., announces its new No. 741 plastics molding press adapted for both the molding of convential thermosetting materials and fast-curing alkyd compounds. The changover is made merely by opening and closing two valves; conversion takes but a few seconds so that the molder can quickly change from one job to another.



The new Model 741 is fully automatic in operation. Used for conventional materials, it has a capacity of 50 tons with a 15″ x 13″ platen area. For high speed alkyd molding it has a capacity of 24 tons and a fast closing speed of 240 inches per minute. For protection of the mold, this rate is reduced a split second before the force enters the mold.

SPECIAL PRICE ON

WOODRUFF KEYSEAT CUTTERS, SHANK TYPE, H.S.S.

Number *Amer. Stand.	of Cutter Old Stand.	Diameter	Width Face	Length Overall	Our Price
...	201	1/4"	1/32"	2 1/16"	$2.80
...	206	3/16	1/32	2 1/16	2.80
...	207	7/32	1/32	2 1/32	2.80
...	211	5/16	1/32	2 1/16	2.80
...	212	3/8	1/32	2 1/32	2.80
...	213	3/8	1/16	2 1/16	2.80
204	1	1/2	1/32	2 1/16	2.24
304	2	1/2	3/32	2 3/32	2.24
305	4	5/8	3/32	2 3/32	2.24
404	3	1/2	1/16	2 1/16	2.24
405	5	5/8	1/16	2 1/16	2.24
406	7	3/4	1/16	2 1/16	2.48
505	6	5/8	3/32	2 3/32	2.24
...	61	5/8	1/16	2 1/16	2.24
506	8	3/4	3/32	2 3/32	2.48
...	91	3/4	1/4	2 1/4	2.48
507	10	7/8	3/32	2 3/32	2.72
606	9	3/4	1/16	2 1/16	2.48
607	11	7/8	1/16	2 1/16	2.72
...	12	7/8	3/32	2 3/32	2.72
608	13	1	1/16	2 1/16	3.04
...	14	1	3/32	2 3/32	3.04
...	152	1	5/16	2 5/16	3.36
609	16	1 1/8	1/16	2 1/16	3.36
807	A	7/8	1/4	2 1/4	2.72
808	15	1	1/4	2 1/4	3.04
	17	1 1/8	1/32	2 3/32	3.36
809	18	1 1/8	1/4	2 1/4	3.36
...	19	1 1/4	1/16	2 1/16	3.68
...	20	1 1/4	3/32	2 3/32	3.68
810	21	1 1/4	1/4	2 1/4	3.66
811	22	1 3/8	1/4	2 1/4	4.00
812	24	1 1/2	1/4	2 1/4	4.40
1008	B	1	1/16	2 1/16	3.20
1009	C	1 1/8	5/16	2 5/16	3.52
1010	D	1 1/4	1/16	2 1/16	3 92
1011	23	1 3/8	5/16	2 5/16	4.32
1012	25	1 1/2	5/16	2 5/16	4.72
1210	E	1 1/4	3/8	2 3/8	3.92
1211	F	1 3/8	3/8	2 3/8	4.32
1212	G	1 1/2	3/8	2 3/8	4.72

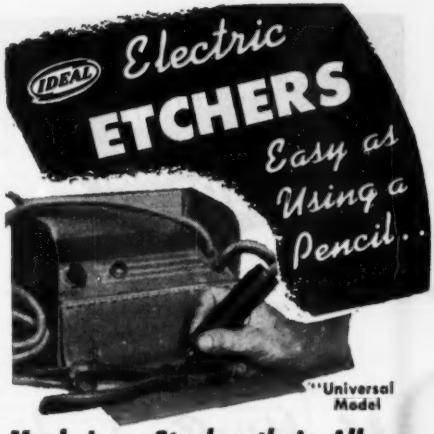
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No. of Cutter	Nom. Diam.	Face Width	Hole Size	Our Price
26	2 1/16"	3/16"	3/4"	$4.72
27	2 1/8	1/4	3/4	4.88
28	2 1/8	5/16	3/4	5.12
29	2 1/8	3/8	3/4	5.44
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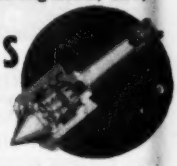
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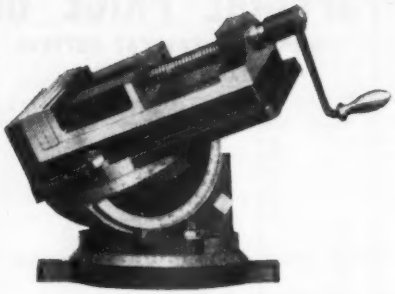
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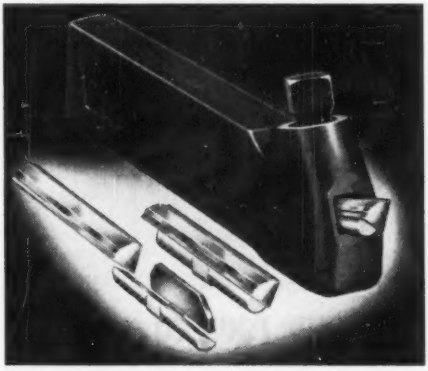
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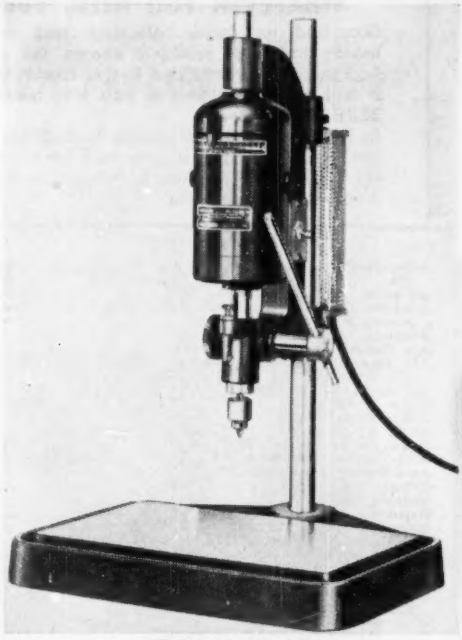


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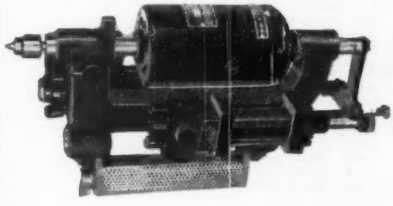
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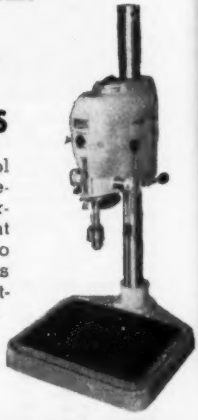
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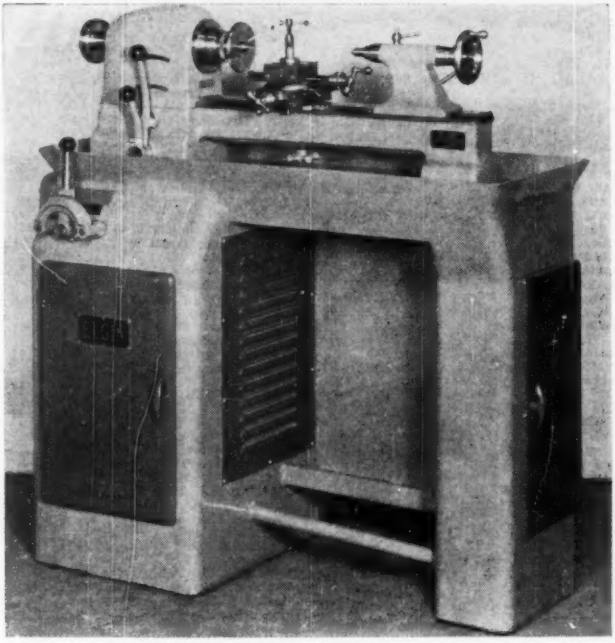
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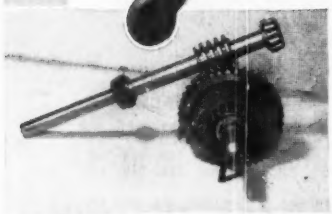
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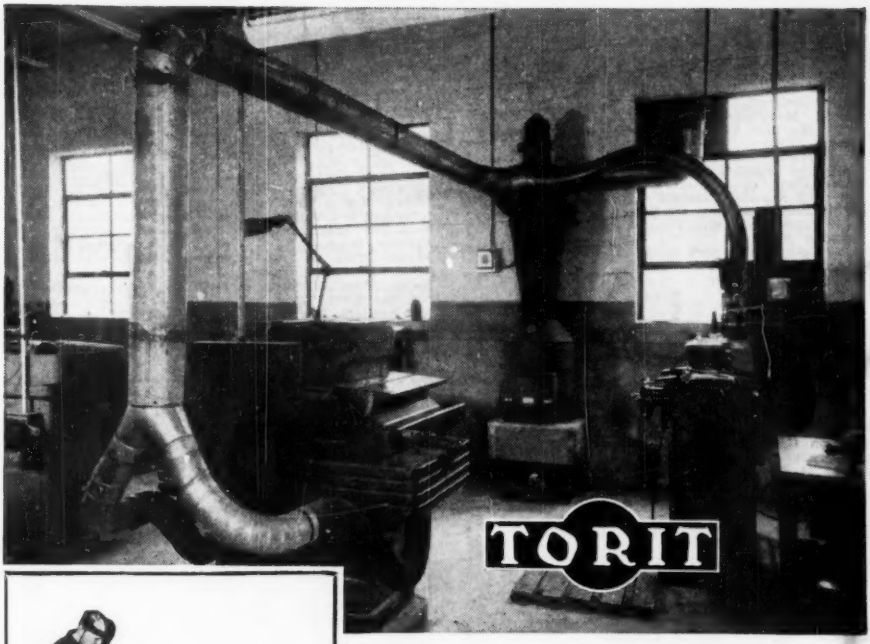
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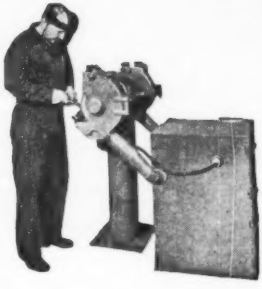
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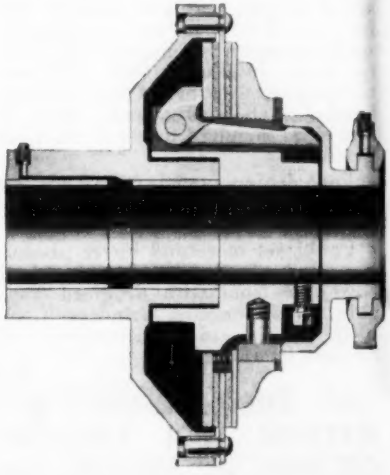
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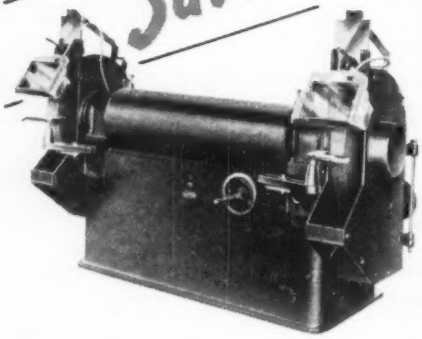
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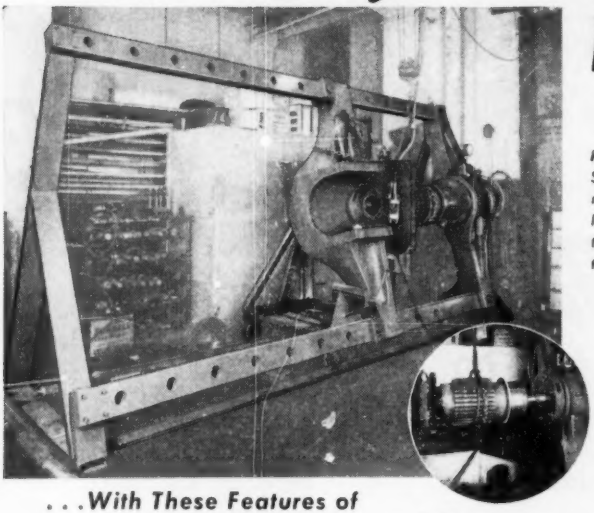
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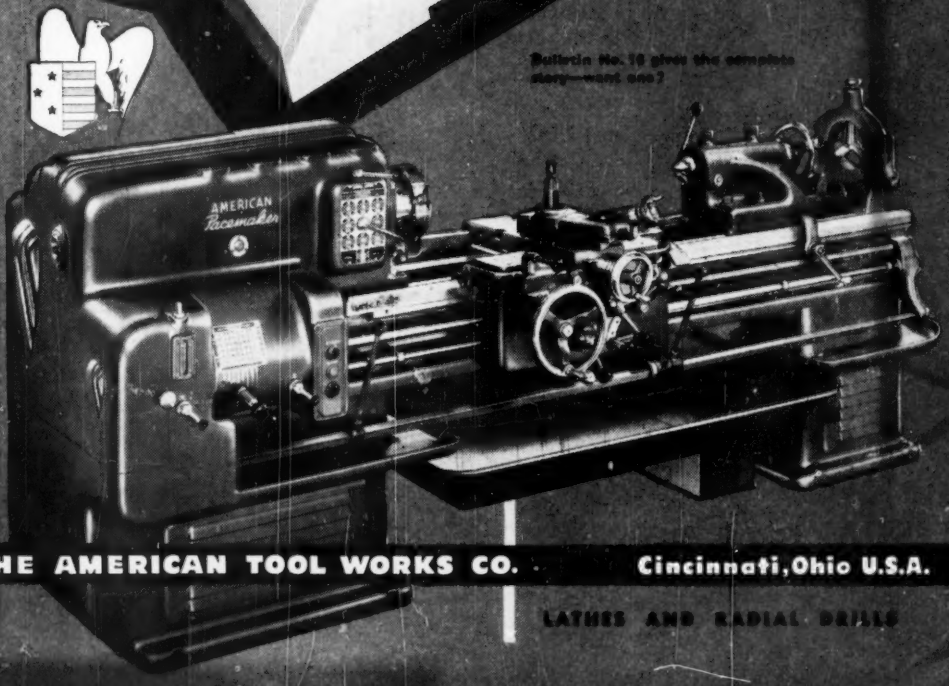
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